Gas Journal

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Editorial Notes

Electricity Plans

AFTER a most peculiar procedure the Government published last week a confidential memorandum which had been circulated by the Ministry of Transport to electricity undertakings and which had become known throughout the country as " the secret White Paper." The memorandum, which is entitled " Electricity Distribution " is described as an " outline of the main provisions proposed for securing the re-organization of distribution on the general lines recommended in the Report of the Committee on Electricity Distribution." The McGowan Committee published its Report a year ago, and the findings were reviewed in the " JOURNAL " for July 1 last. The Government's present proposals, which differ in important respects from the recommendations of the McGowan Committee, will be embodied in a Bill; and judging from the reactions to these proposals, and there has been strong criticism from opposing political parties and from the electricity industry itself, we think the Gas Industry should be thankful that it is not yet, as a public utility, also a political pawn. Whatever these criticisms, however, the Government's plans in regard to electricity distribution demonstrate in no uncertain manner the urgent need for regional planning within the Gas Industry, the necessity for united action and common policy.

The Government's proposals incorporate the principle of compulsory amalgamation to form larger distribution units as suggested in the McGowan Report and lay down the forms such amalgamations should take; but they discard the McGowan recommendation in regard to the appointment of temporary district commissioners to review all undertakings in given areas, and greatly increase the powers of supervision and administration of the Electricity Commissioners. There are three bases to the proposed scheme of compulsory amalgamation. First, the acquisition by one undertaking of other undertakings in a given area; secondly, the transfer of all undertakings in an area to a newly constituted distribution authority; thirdly, the transfer of two or more local authorities to a newly constituted joint board. At present the number of authorized distributors of electricity in this country is 626—371 local authorities, 8 joint electricity authorities, and 247 companies. Of the companies about 170 are associated with or controlled by larger concerns or by a holding company. It is proposed that there shall be 30 distribution districts and that the number of undertakings should be reduced to 76, with certain sub-sections, which would bring the total of distribution undertakings to 123—a reduction of 80%. The Electricity Commissioners will decide how the grouping is to be done. The second basis of transfer referred to above is a distinctly new principle. It means the formation of a Board of not less than seven or more than twelve electricity dictators appointed by the Ministry of Transport. This Board would apply to amalgamations of companies and local authorities where straight absorption would be impossible. Then an Arbitration Tribunal is to be set up by the Lord Chancellor to determine the purchase price of undertakings where not otherwise agreed; and in any case it will fall to the Tribunal to approve of the purchase price in instances where the price has been agreed between the purchaser and the vendor, which gives another indication of the power which will be vested in the Electricity Commissioners. Whether such an extreme form of bureaucratic control will stifle initiative in the early working of the scheme remains to be seen; it seems to us that it will. The whole scheme appears to be planned towards complete nationalization of the electricity industry. The Commissioners have powers to determine the form and conditions of new capital and impose restrictions on holding companies; they can demand more rigid preparation and delimitation of accounts. Will it be possible, we wonder, to preserve the revenue of the Central Electricity Board, increase, through amalgamation, the capital of the electricity industry, and achieve sufficient economies at the same time to reduce the price of electricity to the consumer?

The Field Before Gas

THE plans will, however, result in a huge electrical onslaught on the domestic load of the Gas Industry; and while the Electricity Commissioners are striving to disentangle the complications which undoubtedly surround the new scheme it is up to the Gas Industry to make strong its defences by improving its services throughout the country. Under the new scheme authorized electricity undertakings will be *compelled* to offer two-part or other tariffs for domestic and other supplies; this power to be coupled with a further power whereby, on any revision of authorized maximum prices, separate maxima may be fixed, or separate methods of charge imposed, in

respect of different classes of supply. They will be *compelled* to provide distribution mains of adequate capacity within a prescribed period in uncabled streets in built-up areas; to submit and carry out approved schemes of extensions for undeveloped areas; and to offer facilities for assisted wiring and for the hire and hire-purchase of electrical apparatus. All this will, of course, cost money; and the consumer will have to pay it—by using more electricity at the expense of gas. That is the idea. To what extent it will be translated into effect depends entirely on our own efforts to perfect gas service.

While there is so much talk about electricity, however, it is salutary to maintain a sense of proportion. During the last ten years the increase in gas sales represents an increased heat supply to the community of about two-and-a-half times the total amount of electricity now used for domestic heating purposes. This was brought out in the Paper by Mr. C. A. Masterman before The Institution of Gas Engineers. Other figures he gave show that the doubling of the present small water heating load would increase gas sales by about 5%, while the provision of gas central heating to 1% of the gas consumers in the country would increase sales by about 10%. As for space heating, we have strongly advocated the desirability of pushing the background heating load. The time is coming when there will be a much more general demand for heating which will " take the chill " from a house; and background heating could be economically carried out by burning a sulphur-free gas fluelessly. In this connection Mr. Masterman states that the introduction of flueless heaters into halls and passages in smaller property would, on the basis of one such heater per home, represent an increase of nearly 50% in sales of gas. That is the sort of vision which we should have before us. Another thing we should have in mind is the value of the lighting load. This is to the electricity industry the most remunerative load. The greater the amount of plant put down to meet the lighting demand, the more can the electricity industry offer cut rates for other purposes and particularly for off-peak loads. Loss of gas lighting goes deeper than the loss of revenue entailed; it paves the way to the most intense form of electrical competition in other fields.

A Gas Industry Exhibit

It is just a year since we called attention in these columns to the movement to provide in the Science Museum at South Kensington an educational exhibit worthy of the magnitude and importance of the Gas Industry. The Science Museum is essentially a national institution very largely used by educational authorities and visited by millions of people from all parts of the country, and its popularity is deservedly growing from year to year. Not far short of one and a half million people, mainly youthful and impressionable, visit the Museum annually, and of this number between 30 and 40% are from the Provinces. Each year there are about 30,000 daily public lectures, 22,000 organized parties from schools, and something like 6,000 special lectures to schools. The advantages of a comprehensive exhibit of what the Gas Industry means to the nation are obvious; and we are very glad indeed that the opportunity has been sought and taken of arranging for a representative display worthy of the position in modern engineering and applied science which may justly be claimed for the Industry as we know it to-day. Our Industry has a fascinating story to tell, and the plans which have been formulated will when carried into effect ensure that this story shall be well told.

At present the Museum comprises two buildings, one of older construction and a new building completed in 1927. The latter building represents the first of a group of three blocks. Prior to 1927 the Museum contained a section comprising about forty models of gas manufacturing and purifying apparatus, gasholders, meters, and lighting equipment. This collection, though of historical interest —and some of the models will form part of the new exhibit—by no means could be described as representative of the Gas Industry, and in the re-arrangement of the whole collection necessitated by the completion of the first section of the new buildings in 1927 the models were relegated to stores rooms in the basement. From then till 1934 our Industry had no part in the Museum. In that year, however, a large model of a typical complete modern gas-works was presented to the Museum by the Gas Light and Coke Company and was accorded a place of honour in the Main Entrance Hall. This fine model will form the centre-piece of the proposed new display. In 1934, too, a diorama of a modern all-gas kitchen was erected in the Children's Gallery. So things have stood till the present scheme, which is greatly to be welcomed.

Those who had the opportunity of inspecting the artist's drawing, the provisional lay-out of the proposed new exhibit, during the Institution meeting a fortnight ago must have been more than favourably impressed by the magnitude of the display and the idea behind it all. It is aimed to plan an exhibit which will not only illustrate every aspect of the history, the manufacture, and the utilization of gas, but will do so in a manner calculated to make the subject extremely interesting to the general public and easily understandable by them, while forming at the same time valuable documentation for the student and the engineer. The main principle of the exhibit is that the major models and similar units should be shown in a definite sequence so that the spectator walking through the gallery allotted —which is 150 ft. long and 30 ft. wide—will understand clearly what the models represent, how they work, and their importance in the development of the Industry. The aim is that the display shall be palatable to the general public without sacrifice of its scientific importance. An appeal is to be issued by the British Gas Federation for contributions to a fund to defray the cost of the work and for gifts of models, and so on, dealing with both gas manufacture and utilization, of historical and educational interest. It is an appeal which should meet with ready and generous support.

The B.S.I.

For long now the Gas Industry has co-operated with the British Standards Institution in the drafting of specifications; and we think there will be general agreement that the specifications which have been issued, modified from time to time—for these specifications are always open to revision—have been extremely helpful. Of recent years, however, this co-operation between those who make and supply the gas and those who manufacture gas making and gas using equipment with the B.S.I. has become much closer. Fortunately it is recognized that standardization must on no account be allowed either to retard invention or to eliminate individuality, and we feel sure that this is dominant in the mind of the Gas Industry in seeking and fostering the co-operation of the manufacturer with the object of mutual advantage. In the long run the manufacturer benefits from the standardization of certain component parts of apparatus, which, without affecting the individuality of his goods, not only reduces his manufacturing costs but relieves gas undertakings

from unnecessarily high maintenance charges. It reduces, too, the carrying of large stocks because of a multiplicity of design in non-essential factors. There is yet too great a waste of time on the district, and inconvenience and delay connected with quite simple installation, maintenance, and repair work—delay due to, say, the need for special tools to fit non-standard parts or to cut special threads, and so on. Standardization in this direction as in many other ways is greatly to be welcomed.

There is, of course, a Gas Industry Committee of the British Standards Institution, and this Committee has set up Technical Committees to establish methods for the evaluation of efficiency and performance of plant in which gas is used, to bring about a greater measure of standardization of what may be termed accessories, such as lighting fittings, gas meter unions, and the like; and apart from gas making and using plant there are Committees concerned with coal and the by-products of carbonization. In the report of the Society of British Gas Industries presented at the annual meeting last month mention was made that during the past year good progress has been made towards placing the Gas Industry Section of the British Standards Institution in a more satisfactory financial position. The contributions from the national organizations have been put on a basis which is comparable with those of organizations in other industries; and in addition individual gas undertakings and manufacturers have been invited to become contributing members of the Section. It may be mentioned that at the moment the Society of British Gas Industries, maintaining its close co-operation with The Institution of Gas Engineers, is represented on no fewer than twenty Committees, Sub-Committees, and Panels of the B.S.I.

These thoughts arise from the annual luncheon of the British Standards Institution held in London last week—an important function attended by many distinguished guests. The occasion impressed us with the enormous volume and wide variety of the work for which the B.S.I. is responsible—work, let it be remembered, carried out by the hundred-and-one committees voluntarily. As the Hon. R. G. Casey, Treasurer of the Commonwealth of Australia, remarked at the luncheon, the B.S.I. is a typical British institution evolved by agreement reached through discussion and the sifting of views. It cannot empower the specifications to be adopted by industry; but we hope and believe that as time goes on the specifications issued will meet with more general and readier acceptance. We think that as the work organized by the B.S.I. becomes more widely known—work which benefits both buyer and seller—its importance will be more fully appreciated. The Gas Industry certainly has everything to gain by co-operating with the Institution; and the Industry's thanks are due to those members of its personnel, in which we include the personnel of the firms who manufacture gas making and gas using equipment, who devote so much of their time to furthering the aims of the B.S.I. and in this way helping the progress of our Industry.

Grass-Drying Developments

It is gratifying to observe that increasing recognition is being given in " Official Quarters " to the importance of artificial drying of grass, as was evidenced again last week by a statement made in the House of Commons by Mr. W. S. Morrison in the course of the debate on the Ministry of Agriculture Vote. The Minister of Agriculture's remarks were largely concerned with the new milk scheme and stock raising generally, in which connection he called attention to the need for improving and increasing the grass crop—a matter which is vital from the defence point of view. Much experimental work has already been carried out in this direction; but the grass yield of this country could, it is estimated, be increased, without undue strain, by as much as 15%—which would be equivalent, on the basis of three acres to a cow, to food for a million more head of cattle.

Grass is still, and is likely to remain, the staple food of the animal; it is by far the cheapest; it is home-grown; and it provides the best milk. As a fresh food, however, it is not an all-the-year-round product in itself sufficient to maintain cattle in proper condition, while the hay-stack provides but a poor substitute. Sooner or later each winter the farmer has to fall back upon imported oil cakes or concentrated foodstuffs of one kind or another. This position can be substantially improved by a wider application of artificial grass-drying—but only when some scheme has been evolved to make the process available to the smaller farmer, who cannot hope at the present juncture to lay his hands on sufficient capital to put down so relatively costly a plant, whatever the benefits that may eventually accrue.

At any rate, Governmental recognition of the importance of artificial grass-drying is a welcome first step towards that greater and more tangible measure of support which everyone interested in agriculture ardently hopes will be forthcoming. As Mr. Morrison said, by co-operation much might be done to make the scheme available by trying to spread the cost. And plant manufacturers, together with the producers of coke—which is far and away the best fuel to operate the drier—can in the meantime do much themselves towards producing standard coke-fired equipment in various sizes and at a reasonable figure. Alternatively, grass-drying on a regional basis might be considered, though a number of difficulties will inevitably be encountered in this direction, for the British farmer has always been and will probably ever continue to be a very independent person.

Forty-six grass-dryers were in operation throughout the country last year, and although the summer was extremely wet—thus increasing the cost considerably—the consensus of opinion was that the process is—to use the Minister of Agriculture's own words—" of extreme value to our cattle and our agriculture." We referred in the " JOURNAL " a fortnight ago to a coke-fired drier which has recently been put to work on a farm at Chessington, in Surrey, and in this instance the semi-producer furnace was designed by the London and Counties Coke Association. Moreover, the test figures showed a remarkable degree of efficiency.

The L.C.C.A. are fully awake to the potentialities of this load for the Gas Industry; but they cannot be expected to go on playing a " lone hand." It is up to every individual gas undertaking throughout the length and breadth of the land to give the closest examination to the possibilities of introducing or extending the process in their own area. A little helpful propaganda on their part, supported by the technical assistance which they may confidently expect from the L.C.C.A. or other district coke selling organizations, will surely stimulate a new market for coke, the extent of which is potentially very great. In this connection it is of interest to note that an example of a coke-fired grass-drying plant is being displayed at Alloa next week in connection with the Annual Show of the Highland and Agricultural Society of Scotland.

Personal

Mr. J. N. WHYTE, General Manager and Gas Engineer at Monte Video, arrived in England on leave on June 9.

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The Yorkshire Commercial Section of the Manchester District Association of Gas Engineers, gave a dinner on June 8 at the Great Northern Station Hotel, Leeds, to Mr. EDWIN H. HUDSON, who on his retirement from the position of Engineer and Manager has recently been appointed Chairman of the Normanton Gas Company. A presentation was made to Mr. Hudson of a silver tea service and tray, in appreciation of his long and valuable services to the Gas Industry.

Mr. Hudson has been Chairman for over ten years of the Yorkshire Commercial Section, and also of the Yorkshire Joint Tar Board. He has also been Deputy-Chairman of the District Executive Board of the National Gas Council and the District Committee of the Federation of Gas Employers for 14 years, and has been a member of the Central Executive Board of both these bodies for a similar period. He has also been a member of the Yorkshire (West Riding) Regional Joint Industrial Council since its inception in 1920. Mr. Hudson has recently been elected Chairman of the Gas Industry Representatives on the District Joint Consultative (Gas Coal) Committee for the Midland Amalgamated District.

Mr. C. S. Shapley (Leeds), in making the presentation, spoke in affectionate and glowing terms of Mr. Hudson, and of his valuable services to the Gas Industry. Several other of Mr. Hudson's colleagues, including Mr. Charles Wood (Bradford), who was formerly Chairman of the Gas Organizations in Yorkshire; Mr. F. D. Richmond, Past-Secretary; Mr. J. H. Brearley, Past-Secretary; Mr. J. E. Lister Cooper, Present Secretary; Mr. W. B. McLusky (Halifax); Mr. A. L. Jennings (Spenborough); Mr. J. Bridge (Elland); Mr. H. Singleton (Huddersfield); Mr. H. Burton (Shipley); Mr. A. E. Mottram (Ossett); Mr. J. E. Holliday (Otley); Mr. A. F. Yates (Goole); Mr. J. W. Horwill (Bradford); and Mr. P. MacDougall (Wath) spoke in appreciation of Mr. Hudson's charming personality and conspicuous services to the Gas Industry, which it is gratifying to learn will continue to be available.

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The Inverbervie Town Council have appointed Mr. JAMES MACDONALD as Manager of their Gas Undertaking in succession to Mr. A. D. Coubrough, who, as was recently recorded in these columns, left to take up a similar position at Biggar. Mr. MacDonald comes from Dunkeld, where he has been Manager of the Gas Undertaking there for the past nine years; he is the son of Mr. J. MacDonald, Gas Manager at Birnam.

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The wedding was celebrated last week at Christ Church, Sunderland, of Mr. GEOFFREY J. B. COX, eldest son of Mrs. and the late Mr. N. S. Cox, of Holmlands Park South, Sunderland, and Miss Eleanor Pollock, youngest daughter of Mr. and Mrs. Gilbert Pollock, of West Lawn, Sunderland. The bridegroom is with the Gas Light and Coke Company, and his father was for 21 years Secretary of the Sunderland Gas Company.

News in Brief

CURRENT EVENTS IN THE GAS INDUSTRY

To Borrow £15,000 in connection with expenditure in the Gas Department, the Hamilton Town Council on June 8 agreed to give statutory notice of their intention.

The Directors of the Whessoe Foundry and Engineering Company, Ltd., have decided to recommend the payment of a dividend of 20%, less tax, in respect of the year to March 31.

Supplies of Benzole, the Manchester Corporation Central Purchasing Committee has instructed the various departments of the Corporation, are to be obtained from the Gas Department.

For Their Excellent Coronation Display in a local contest, at a recent meeting of the Clapham and District Chamber of Commerce, the South Metropolitan Gas Company were presented with a cup.

The Following Tenders have been accepted by the Manchester Corporation Gas Committee: Messrs. R. & J. Dempster, Ltd., Manchester, for alterations to purifiers, and Messrs. Stewarts & Lloyds, Manchester, for steel tubes.

A New Gasholder with a capacity of 2 million cu.ft. is being built near the by-products building at the Ford Works, Dagenham. This holder will be used as an emergency reserve for the works; it will be 126 ft. in diameter and 185 ft. high.

Applications are Invited by the County Borough of St. Helens for the position of Gas Engineer and Manager at a commencing salary of £850, rising by annual increments of £50 to £1,000 per annum. Further particulars are to be found in our advertisement columns.

Among the Objects of a Special Order for which the Basingstoke Gas Company intend to apply to the Board of Trade under the Gas Undertakings Acts, 1920 to 1934, is the alteration of the prescribed number of Directors of the Company and to make new provisions as to the quorum of a meeting of Directors.

The Gas Output of the Metropolitan Gas Company of Melbourne during the week ended April 25 was over 99 million cu.ft. against nearly 93 million cu.ft. in the corresponding week of last year, representing an increase of 6·87%. The increase since Jan. 1 has been 5%. The total gas made per ton of coal was 18,532 cu.ft. against 16,616 cu.ft. for the same week of 1936. An official test for mixed gas reveals a calorific value of 551 B.Th.U. per cu.ft.

The Kirkcaldy Gasholder is definitely to be built at the Gas-Works site adjacent to Links Street. The Town Council, at a special meeting on June 8, refused to suspend standing orders "to consider the question of finding an alternative site," and "to enable instructions to be given to stop work at Links Street forthwith."

At a Special Meeting of the Town Council of Largs, held on June 7, tenders for a complete installation of vertical retorts were considered. Along with the offers, a report and recommendation by Mr. George Braidwood, Coatbridge, were considered, when it was unanimously agreed to accept the offer of Messrs. West's Gas Improvement Company.

The Advent of Electricity, under the Dumfriesshire County Council's scheme some three years ago, it was thought in certain quarters, would affect gas undertakings in several small towns and burghs, including Sanquhar. However, the Undertaking at Sanquhar forges ahead, the consumption for the year ended May 15, 1937, being 7,930,000 cu.ft., or 110,000 cu.ft. more than in the previous year.

A Home Service Exhibition, arranged by Mr. A. F. Ames, Engineer and Manager of the Burnley Gas Department, drew record attendances at the Methodist School, Hapton, where Miss Eccles, of the Cannon Research Kitchen, was the demonstrator. There were numerous entries for the two classes of cake-baking competitions, the prizes for which were presented by Councillor J. E. Yates, Chairman of the Gas Committee. A continuation of the lectures at the showrooms during the past week also attracted many interested persons.

The Coatbridge Gas Company have now completed the laying of the mains in the village of Chapelhall in order to afford a gas supply. The gas has been turned on, and the service connections to consumers' premises are being rapidly proceeded with. The Company have completed arrangements with Lanark County Council for the supply of gas cookers and wash-boilers to the 156 houses. The Company have been rapidly developing their area during the past four years. A few years ago the Company was authorized to extend into the detached part of Dumbartonshire in the north and into Shotts in the east. The whole of the northern part of the new area has already been developed, and several villages have been coupled up. Negotiations are now taking place with regard to a supply to houses at Salsburgh.

The Summer School for Gas Fitting Teachers held at Watson House from June 7 to 11 was concluded in a very happy manner on Friday last when the delegates attending the course assembled at luncheon in the Restaurant of Westminster Technical Institute under the Chairmanship of Mr. J. H. Currie, Inspector of Technical Education, London County Council, who was Director of the Course, the Assistant Director being Mr. R. N. LeFevre, Officer-in-Charge of Training, the Gas Light and Coke Company. Dr. J. N. Long, Principal of the Institute, was thanked on the proposition of Mr. Currie for his very happy inspiration for the termination of the Course. The luncheon, which was excellent, was cooked by students with, of course, the aid of gas.

Negotiations between the Glasgow Corporation and Messrs. William Dixon, Ltd., ironmasters, Glasgow, for a supply of coke oven gas in bulk are to be reopened. The offer of Messrs. Dixon to supply 6 million cu.ft. of unpurified gas daily at a price of 5½d. per 1,000 cu.ft. was considered by a Sub-Committee of the Corporation Gas Committee on June 8, when it was agreed to meet representatives of the firm to discuss details of the tender. Although the price quoted by private firms has been considerably lower than the actual cost of gas manufactured in the municipal plants, the majority of the Corporation members have turned down all proposals on the grounds that it would be detrimental to the workings of the Corporation undertakings.

Gas at the "Highland and Agricultural" Show

A Comprehensive Display

A comprehensive gas display has been arranged at the Annual Show of the Highland and Agricultural Society of Scotland, which is being held at Alloa from June 22 to 25 inclusive. This Show is the largest of its kind North of the Tweed and is visited by thousands of people from all parts of the British Isles.

The Gas Exhibit is taking the form of a Stand measuring 100 ft. by 20 ft. and is being organized by the British Commercial Gas Association in conjunction with the Alloa Corporation Gas Department. The Stand includes a demonstration hall, kitchen, bathroom, &c. In addition to various manufacturers' exhibits a grass-drying plant will be displayed, and a representative of I.C.I. will be in attendance.

Electricity Failed to find favour with a special committee of the Angus County Council on June 7, who agreed to defer consideration of the installation of electricity into all schools and county building pending revised terms from the Grampian Electricity Company, Ltd. It was stated that it would require almost 11s. worth of electricity to do the work of 6s. 8d. worth of gas, and that therefore the lighting and power bill would be almost doubled.

Forthcoming Engagements

June.

18.—NORTH OF ENGLAND ASSOCIATION (AUXILIARY).—Meeting at Middlesbrough.
18.—WAVERLEY ASSOCIATION.—Annual Meeting at Edinburgh.
19.—LONDON AND SOUTHERN JUNIORS.—Summer Visit to Luton.
21.—LONDON AND COUNTIES COKE ASSOCIATION.—Executive Committee, 11.15 a.m. Central Committee, 2.30 p.m.
23.—I.G.E.—Pipe Committee, 3 p.m.
24.—SOUTHERN ASSOCIATION (EASTERN DISTRICT).—County Meeting at Luton.
25.—I.G.E.—Joint Lighting Committee, 2.30 p.m.
25.—B.C.G.A.—Scottish Conference at Peebles Hydropathic.

(There will be no meeting of the Central Executive Board of the National Gas Council during the month of June.)

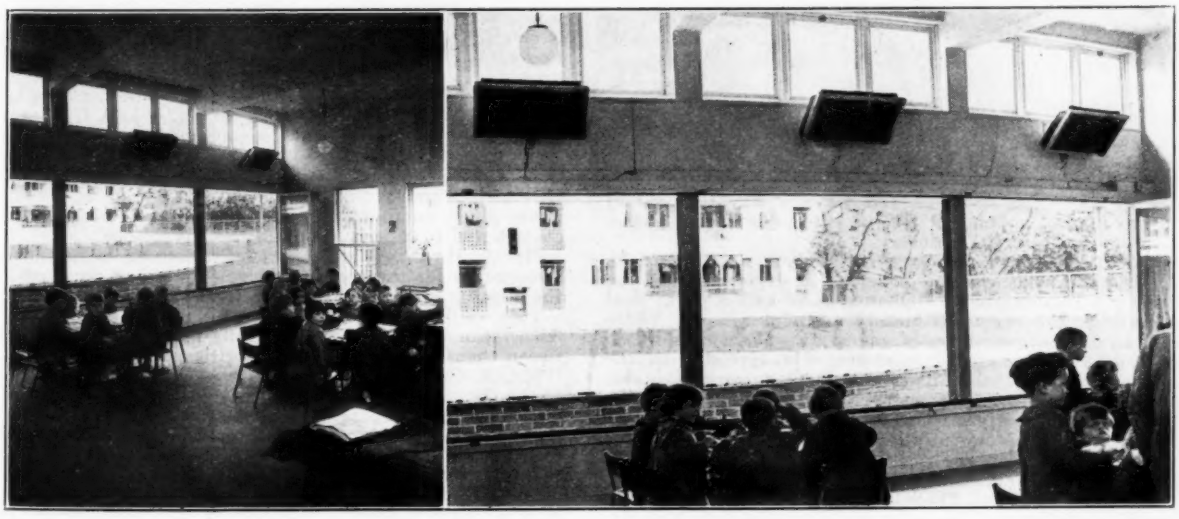
July.

2.—I.G.E.—Joint Committee on Complete Gasification under Pressure, Department of Scientific and Industrial Research, 16, Old Queen Street, S.W. 1, 3 p.m.
9.—SOUTHERN ASSOCIATION.—Summer Meeting at Southampton.
13.—I.G.E.—Council Meeting, 10 a.m. (*The Special Council Meeting which was to have been held on June 18 has been cancelled.*)
14.—B.C.G.A.—Executive Committee Meeting, 11.30 a.m.; General Committee Meeting, 2.30 p.m.
15.—I.G.E.—Gasholder Committee, 2.30 p.m.

Sept.

9-10.—NORTH BRITISH ASSOCIATION.—Annual Meeting at Edinburgh.

Overhead Gas Panel Heaters for Nursery School



The above photographs show the Bratt Colbran rectangular overhead radiant heaters installed in the Nursery School at Kensal House, Ladbroke Grove, W. 10—the model housing estate built for the Gas Light and Coke Company on the site of one of their disused gasholders. A detailed description of the blocks of flats, their gas equipment, and all their attendant amenities was given in the " JOURNAL *" for March 24 last in connection with the official opening of the estate.*

B.C.G.A. Manchester District Conference

Smoke Abatement Discussed at Oldham

Lancashire and Cheshire gas undertakings were well represented at the Manchester (Lancashire Section) District Conference of the British Commercial Gas Association, held at the Town Hall, Oldham, on Thursday, May 27, when the Mayor of Oldham (Councillor F. Tweedale, J.P.) presided, and a Paper on "Smoke—Friend or Enemy" was given by Prof. J. Johnstone Jervis, M.D., D.P.H. (Medical Officer of Health for Leeds).

The Mayor mentioned, in welcoming the representatives, that Oldham took second place to no other undertaking in the country in the fact that the gas appliances were 1½ per consumer; out of the population of 225,000, there were 62,000 consumers and 100,000 gas appliances.

Prof. Jervis emphasized the fact that the new housing estates had not reduced the smoke but had merely spread it out over a wider area. Gas and electricity were used to an increased extent, as a result of the erection of the new houses, neither gas nor electricity being used to any great extent in the old houses. That had to some extent reduced the amount of money available for the purchase of food, and there was a tendency to dispense with the gas or electric cooker and retain the coal fire.

The Professor advocated that there should be a tightening up of the legal side in regard to smoke emission, especially in the smaller industrial areas that fringed our great towns, and if these small areas could not put their house in order, the control must be taken out of their hands and given to those who could. Gas for furnace work and for other processes connected with industry should be made available at the cheapest rate.

The Oldham Medical Officer (Dr. J. Chalmers Keddie), speaking in support of smoke abatement, paid a tribute to the medical value of sunlight in cases of tuberculosis and rickets, and said that the smoke pall over Manchester was responsible alone for the fact that Timperley, eight miles away, with the same climatic conditions, got 82% more sunshine than did the city.

Mr. J. H. Clegg (Southport) said he thought engineers would not agree that electricity was cheaper than steam for power purposes.

Mr. T. Reynolds (Stockport) said medical men ought to have made some effort nationally to assist in cleansing the atmosphere, and medical officers could have recommended that in Council Housing Estates the houses should have smokeless fuel grates installed.

The Mayor of Oldham said that 800 coke fires had been installed in their area, and they had been able to influence surrounding areas to adopt a similar policy.

Contributions to the discussion were also made by Alderman Kearns (Salford) and Mr. C. S. Shapley (Leeds).

A vote of thanks to the lecturer was accorded on the proposition of Alderman Kearns, seconded by Councillor W. Lea (Southport), and a vote of thanks to the Mayor for presiding was moved by the President of the B.C.G.A. (Councillor W. P. Jackson, J.P., Chairman of the Manchester Gas Committee).

The delegates were then entertained at lunch at the Union Club, Oldham, by invitation of the Chairman and members of the Oldham Corporation Gas Committee, the Mayor, who is Chairman of the Gas Committee, presiding.

Mr. J. S. Dodd, M.A., M.P., formerly Deputy-Chairman of the Oldham Corporation Electricity Committee, proposed the toast of "The Gas Industry," and said it had shown one of the finest pieces of salesmanship in the country in recent years. By means of the adoption of modern methods of production and marketing they had been able to hold their own and gain ground in a way that would not have been possible but for the enterprise and initiative of the men within the Industry.

Councillor W. P. Jackson, responding, said that the Gas Industry was making progress in every part of the country. The improved appliances had had a great deal to do with the very satisfactory state of affairs. There were 11 million consumers of gas in the country, and 75% of them were domestic consumers. He agreed with the view that salesmanship had been largely responsible for the success of the Gas Industry, and he felt sure that the B.C.G.A. could fairly claim a large share of the credit for that very satisfactory position. There was a very wide field yet to be captured, if the Industry only divested itself of the crinolines that it wore a few years ago.

Councillor F. Lloyd (Vice-Chairman of the Oldham Gas Committee) proposed the toast of "Our Guests," and Mr. J. Sandon Stubbs (Vice-Chairman of the Executive Committee of the B.C.G.A.) responded.

At the afternoon session, which was private, a Paper on "Refrigeration" was presented by Mr. D. Russell, District Manager, Electrolux, Ltd.

Gas Floodlighting in Jersey

This is how the Jersey Gas Light Company's premises in Bath Street looked during Coronation Week. The floodlighting was carried out by four Sugg's 10-light No. 2 size floodlighting units fitted with special bracket arms. These arms are used for swinging the lamps towards the parapet for maintenance, the installation being for permanent use.

Scottish Junior Gas Association (Eastern District)

Annual Outing to Kirkcaldy

Inclement weather marred the Annual Outing of the Scottish Junior Gas Association (Eastern District) to Kirkcaldy, on Saturday, June 12, and caused the abandonment of the sports programme.

This was compensated for, however, by a visit to the famous Beveridge Park where the flower display and general layout are a living monument to Municipal progress. Visits were also made to the gas-works, where a new high-pressure governor for the Kinghorn main has been installed, with the latest type of compressing engine in addition. The dispute which has arisen in Kirkcaldy local affairs regarding the position of the projected waterless holder drew interest in the foundation which has been made for this. The showrooms were next inspected and a comprehensive display of gas appliances greatly admired.

The party then adjourned to the Pioneer Hall where they were the guests of the Gas Committee at lunch. Councillor Grieve (Convener of the Gas Committee) introduced Provost Wilson, who welcomed the members and appreciated the honour they had done Mr. Dow in electing him their President that year. They were confident he would prove a worthy successor to Mr. Kincaid. Provost Wilson spoke of Kirkcaldy's connection with famous men, Adam Smith and the Brothers Adam having been born here, while Carlyle had resided here for some time. The Corporation were doing their utmost to satisfy the housing needs of the community, and the various housing schemes contributed to the expansion of the gas service.

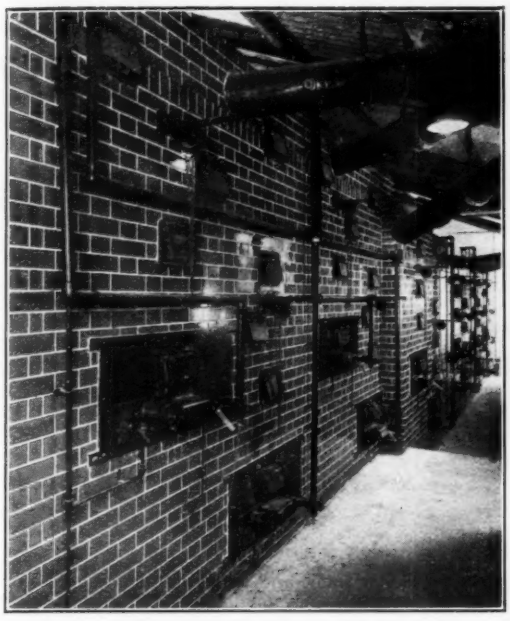
Mr. J. H. Dow thanked the Provost on behalf of the Association for the cordial welcome they had received and the hospitality extended to them. He hoped that the Committee would continue to show their regard for the Junior Associations and help to foster the feeling of goodwill between them and municipal authorities.

Mr. A. C. Rea (Perth), Vice-President, proposed a vote of thanks to the Convener, which was heartily accorded.

The weather had improved when the party set out for a motor tour to St. Andrews, where some time was spent viewing the chief attractions of this Mecca of Golf. Returning to Kirkcaldy, tea was provided in the Pioneer Hall, where Convener Grieve introduced Treasurer Brown, who gave a short history of the growth of Kirkcaldy and the progress of the Gas Department. Mr. Dow expressed appreciation of the kindness shown to the Association and called for a hearty vote of thanks to the Treasurer for his presence. Mr. E. W. Alexander (Edinburgh) returned thanks on behalf of the ladies.

MODERN GAS EQUIPMENT for Sittingbourne's New Bakery

Of all the obligations to its members which the Co-operative Movement imposes upon itself none is more vitally important than the supply of unadulterated and hygienically pure foodstuffs. To this end, therefore, the Sittingbourne Co-operative Society have taken a wise step in equipping their new bakery, recently opened in West Lane, Sittingbourne, with the latest types of gas-fired ovens, gas-engine driven electrical generator, and coke-fired boiler for steam requirements.



Rear View of Ovens, Showing Damper Controls, &c.

The Management of the Sittingbourne Society gave earnest consideration to the subject of fuel, and, after consulting every authority on the subject, decided upon gas.

With gas there is no fuel to be stored—no ashes to cart away. Just turn on a tap and your heat is there. With gas your heat is under perfect control, and, especially with confectionery, different goods have to be baked at different temperatures.

The Sittingbourne District Gas Company, who have supplied gas to this area since 1870, ran a special 8 in. main into the bakery and installed a meter to pass 6,000 cu.ft. per hour.

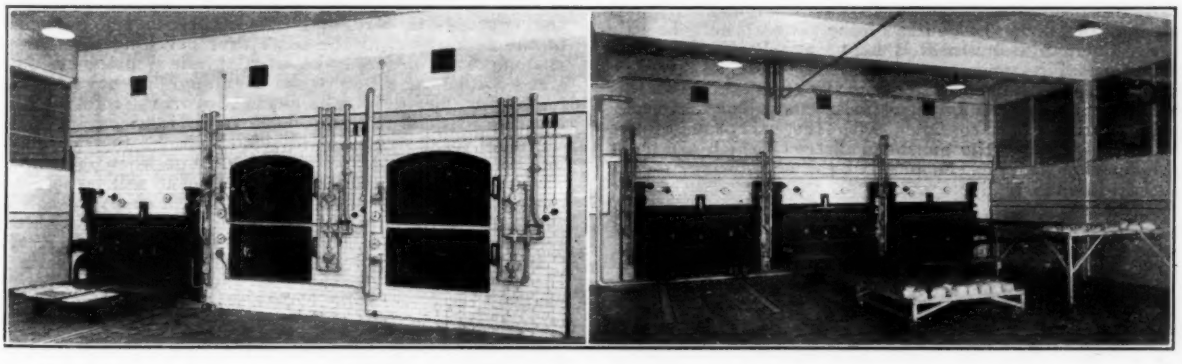
The ovens, installed by Messrs. Baker Perkins, Ltd., of Peterborough, consist of three double-deck drawplate ovens, 10 ft. 9 in. by 5 ft. 9 in. for bread baking, and one similar double-deck drawplate oven and two double-deck peel ovens, 10 ft. by 6 ft., for confectionery. The accompanying illustrations give an excellent impression of the neat layout and cleanly appearance of the gas ovens.

The present output of the bakery is 160 sacks of bread and £200 worth of confectionery per week, but the plant will be able to handle double these quantities.

The gas to the ovens is supplied through a high-capacity Willey meter and is governed by a 4 in. Bryan-Donkin governor before passing into the 4 in. supply pipe which runs the full length of the ovens behind the front curtain wall. The burners are thermostatically controlled, each oven being served by a 2 in. branch pipe taken off the 4 in. supply pipe.

Lighting and power are supplied by a 44 b.h.p. Hornsby gas engine driven generator set, while steam requirements are provided by a coke-fired Cochrane vertical boiler.

The bakery is fully equipped with the most up-to-date machinery for handling dough and for the production of confectionery and is a very fine achievement for all who were concerned in its design and construction.



Front Aspect of the Ovens.

Sheffield Lighting Department

Seventh Annual Report

The report on the work of the Sheffield Lighting Department for the year ended March 31, 1937, states the total candle power of the street lighting system has been increased during the year by almost 290,000. Slightly more than 6½ miles of main traffic route have been dealt with. This lighting meets, somewhat generously, the standard recommended for traffic routes in the Interim Report of the Ministry of Transport Departmental Committee on Street Lighting, and also the requirements of Class "D" of the British Standard Specification for Street Lighting, with the exception of Queen's, Suffolk, and Leadmill Roads, where the lighting is to Class "E" of the Standard Specification.

During the year, extension pieces to raise the point of light to 13½ ft. were fitted to 1,844 lamps. There are now 15,137 lamps throughout the city so equipped.

The number in use totals 15,186 against 15,677 last year. There are 3 "Calor Gas" lamps. The gas consumption amounts to 270,271,218 cu.ft., an increase of 608,923 cu.ft. The total candle power of the lamps in use at the end of the year is 3,184,883, an increase of 287,551 since March 31, 1936. Gas lamps mechanically controlled number 15,104. The efficiency of performance during the year is 99·7%.

The total wages bill for the year is £23,812. Of this sum £1,363 is in respect of allowances paid to 35 ex-employees. During the year we replaced 64,910 gas mantles. This represents an average of 1·712 mantles per nozzle per annum, or an effective life of 213·2 days per mantle.

Behind the Scenes

Serving 130,000 Coke Customers

FIVE THOUSAND separate and distinct coke orders, involving the delivery of nearly 3,000 tons, in a single day. Admittedly this is the highest figure ever recorded in one day; but it serves to indicate the sort of thing the Gas Light and Coke Company may be expected at any moment to take in its stride and execute promptly and efficiently.

"Prompt attention to all orders" is the Company's unswerving motto; and be it five hundred or five thousand orders in one day the customer must be served, so far as is humanly possible, without deviating one iota from this high principle—whatever the additional effort entailed.

Thus, on the third floor at Imperial House, Fulham, a large section of the Rental Department is set apart to deal with more than 626,000 coke orders a year—orders varying from 1 cwt. at a time for many of the working-class housewives to 10 tons a day for the central heating and hot water supply of giant blocks of flats. And just the same routine is required for each. It takes a rental staff of about 120, in addition to the transport personnel, to cope with this business of ensuring that 385,000 tons of coke are promptly delivered to the Company's 130,000 coke consumers in the course of the year. The coke side of the Company's business is kept entirely distinct from any other of its operations, so far as the book-keeping, banking, and separate accounting are concerned; and this vast organization at Imperial House handles the whole business from start to finish with the exception of the actual deliveries in the Southend district, which are dealt with locally, though even here all the accounting is done in the coke rental department.

The Life of a Coke Order.

The tracing of the life of a coke order from the moment of its receipt until the sack is emptied into the customer's cellar or storage bin requires a considerable degree of concentration on the part of the chronicler. In any case there must necessarily be a number of details to which there is no need to refer individually by reason of the fact that they are probably common practice throughout the length and breadth of the land.

A glimpse of the work of the Company's coke section demonstrates, however, what a complicated piece of machinery the customer sets in motion when his coke order goes into the pillar-box or is transmitted by 'phone to Imperial House; and it is all to the credit of the department that so complex a series of evolutions can be welded together to produce such efficient and unfailing results.

However, to begin at the beginning. There are three normal methods by which customers transmit their coke orders—namely, by telephone, by order card through the post, or by verbal intimation at any one of the Company's three score or so showrooms. The last-named type of order is posted, or, if urgent, telephoned, on to Imperial House, so that it can be eliminated as a separate item in considering the actual work of the coke section.

First of all, therefore, there is the telephone room—the nerve-centre of the department. Here twenty-three lines are looked after by a staff of girl operators, each line covering a section of the alphabet and being complete with its own order book and series of pigeon-holes for the filing of the orders when made out. Twenty-three lines sounds ample for any department, but it is a fact that so great is the demand during a cold winter spell that other departments are apt at times to think unkindly of the coke section because they cannot get a free telephone line for their own business.

On the average some 2,000 orders are taken daily over the telephone, while a large number of enquiries are received in the same way. If the operators are themselves unable to answer such queries straight away, they are written down and catapulted on one of those fascinating aerial devices which one sees in drapers' establishments to an enquiry desk in the coke section.

The pigeon-holed orders are collected periodically from the telephone room and passed to the "check file." Here several clerks sit before an impressive array of little drawers which contain record cards for every one of the 130,000 coke customers, arranged in alphabetical order. At this point the telephone orders are joined by those which have come in through the post, and their subsequent treatment is identical in either case. The clerk turns up the appropriate card and enters thereon the particulars of the new order, at the same time checking whether the customer has ordered the usual grade (customers sometimes forget the type of coke they ought to have for their particular purpose). The clerks also transfer to the order form any special standing delivery instructions which may be noted on the check card. Such special instructions do not mean very much at this stage, but when it comes to making up the delivery loads later on it will be seen how extremely awkward customers can be in this respect—and the department aims to accede to customers' wishes in regard to deliveries so far as lies within its power. The "type" of customer is also noted on the order form by the check file clerk—that is to say, whether on domestic contract, cash or credit, ordinary cash customers, or commercial contract.

The Machine Room.

Thus completed, the order forms are passed into the machine room, where girls operating electric typing machines transfer the order on to a series of tickets, varying from six to seven parts. These tickets vary in colour according to the type of customer, and the various sections are as follows: (1) Ledger portion; (2) Delivery note, which is left with the customers; (3) Acknowledgment of delivery, which is signed by the customer and returned via the carman and garage foreman to the coke department for checking purposes; (4) Loading instruction for the works coke foreman or loaders; (5) Works gatekeeper's ticket, for checking at weighbridge; (6) Portion retained by coke section for checking any subsequent enquiries. A seventh portion goes out with cash deliveries only as a form of receipt to be handed to the customer in return for payment.

The first portion of the ticket, or ledger copy, is torn off at once and retained in the control room for listing the gross tonnage and cash value before going on to the ledger department. The remainder pass out to the transport section, where they are first roughly sorted into

with the World's Largest Public Utility

A Coke Lorry ready for the day's deliveries.

We trace the life of a coke order through its many ramifications from receipt to delivery, as handled by the Gas Light and Coke Company's Coke Rental Department at Imperial House, Fulham.

principal areas according to the situation of the Company's various works where coke supplies are available.

Chasing the Coke.

Now begins the tricky part of the business. The department here indulge in a game known colloquially, we believe, as "chasing the coke." The output of coke, both as regards quantity and grade, naturally differs from works to works. Technical men will explain why it differs; but to the coke transport staff it is just a nuisance. For instance, it is obviously quite useless sending along a lorry to a certain station to load up, say, a couple of tons of boiler nuts for local deliveries if that particular works only happens to have large or broken coke available that day.

Accordingly, the department receives each morning a statement showing the amount of the various grades available at each of the Company's works. This illuminating document indicates that at one works there is, perhaps, 50 tons of one grade, 100 tons of another, and 200, 300, or more tons of a third awaiting the convenience of the coke department. A blank against any grade is tantamount to a declaration by the works concerned that "It's no use sending here for any of that to-day, because we simply haven't any." On the other hand, a little tick is a sort of open invitation to "Come right along and help yourselves; we've plenty to go round to-day." Sometimes several works exhibit a triumphant series of ticks against all grades; others a depressing number of blanks or a "very limited" tonnage of certain grades. So much, then, for the initial sorting of coke orders into general areas.

But this is very far from the whole story. The department next have to know the type and extent of transport facilities available at each of the garages attached to the works. So a similar return arrives each day from the garage foremen, showing that there are, say, two 3-ton vehicles, three 2-ton lorries, one 4-tonner, and a sprinkling of horse-drawn vehicles at the disposal of the coke department. While giving the horses their fair share of the work, it must be remembered that a horse cannot be expected to draw a 5-ton load of coke to customers half-a-dozen miles away; the old grey mare is limited to small deliveries within a radius of a couple of miles or so of her home ranch.

With all these facts at their finger-tips, therefore, a start can be made with the making up of delivery loads; but this again is by no means the simple task it might at first sight appear. At this stage delivery instructions have to be taken into consideration, and now we discover for the first time how extraordinarily awkward customers can sometimes be. Mrs. Smith, at No. 13, Acacia Villas, wants her coke delivered before she sets out on her morning's shopping expedition at 10 a.m., while Mrs. Brown, two doors away, wants hers after 2 p.m.—entailing two separate journeys to the same road in one day. Again, Mrs. Jones requires boiler nuts, while Mrs. Robinson, next door, wants a larger grade for her open fires; and even if the nearest works happens to have both grades available that day the two orders cannot be delivered in the same vehicle by reason of the unloading difficulties which would probably be involved, as well as the complications in loading. So far as possible, each lorry carries only one grade at a time; otherwise the carman is liable to find that the particular delivery he wants to unload is unfortunately at the wrong end of his vehicle; this might mean unloading all the rest into the road in order to get at it—which would waste a lot of time and prove very unpopular with other traffic.

Among other idiosyncrasies of individual customers is that some are firmly convinced (rightly or wrongly) that they can only burn horizontal retort coke in their stoves, while others affirm that only vertical coke will do for them. All such requirements have to be met, even though it entails loading up deliveries at a more distant station. This, in turn, means that the lorry trips have to be carefully planned so as to obviate unnecessary mileage; Brentford lorries must not be sent, for instance, to Bromley to pick up a certain grade of coke; a vehicle from a nearer station must be requisitioned for this job in order to shorten the total distance covered in delivering the load.

The Central London area also presents its own particular problem, for here Police Regulations prohibit the delivery of coal or coke between certain hours—which often means that the deliveries have to be made at a shockingly early hour of the morning. Again, commercial premises want their coke before they open their doors to the public, and such orders frequently call for the services of an additional

Making up Coke Orders into Deliveries.

carman in order to get the coke into store with as little delay as possible. Thus we are able to appreciate the importance of the work of the check file clerks in transferring all these special standing delivery instructions ac-

A busy scene in the Coke Department's Telephone Order Room at Imperial House, Fulham.

curately to the order form. Mistakes here would cause untold complaints.

Making up the Loads.

With all these facts before them, therefore, those responsible for making up the district orders into individual lorry loads can go ahead. When the tickets have been made up into loads and slipped into celophane envelopes to keep them clean, they go through a perforating machine which stamps them, along with the original order form, with the date and a number representing the loading station. When a driver is required to load his lorry at a station other than the one at which his vehicle is normally kept, a special white label is attached to the batch of tickets indicating where he has to go.

At this point in the proceedings Part 6 of the ticket is torn off to be retained in the coke section for the tracing of any subsequent enquiries that may come in, while the original order form is extracted and filed away. The remainder of the tickets are then passed to Burroughs machine operators, who list the various particulars on what are known as " garage sheets." These sheets, containing details of each order, grouped into their individual loads, are executed in quadruplicate. The first two parts, together with the bundles of tickets, are now ready for despatch to the various garages, while the remaining two copies are retained for office reference and summarizing. The following morning the quantities of the different grades of coke are extracted from these sheets so that it is known how much coke is being drawn from each works.

The garage tickets are sent in the evening to the garages concerned, where the foreman on duty, also having a list of the lorries available, stamps the drivers' names on the tickets, enters the vehicle numbers in the appropriate column of the garage sheet, and makes out a cash slip for each carman. Thus everything is ready for the men when they come on duty the next morning.

At 6 a.m. when the transport drivers sign on they are immediately handed their orders, and proceed forthwith to the works indicated on their tickets to pick up their first load. On arrival at the works, the driver hands No. 4 Section of his ticket to the coke foreman or loader in charge, and the vehicle is duly filled up with the required grade and tonnage. The driver next proceeds to the weighbridge, where his load is checked with No. 5 portion of the ticket which is handed to the gatekeeper. When the carman arrives at the customer's premises he hands No. 2 portion of the ticket to the latter, and when the coke has been delivered he obtains a signature, as proof of delivery, on No. 3 portion. In the case of cash customers, the receipt portion is handed to the customer in acknowledgment of the amount received.

On returning to his garage at the completion of his deliveries, the carman hands all the signed tickets and cash to his foreman, who checks them with his garage sheet to see that every ticket is accounted for. The driver then receives his next batch of tickets and goes to load up for his second delivery. Each vehicle usually deals with three loads a day.

The cash received is passed on by the garage foreman to the station head clerk at the gas-works, who gives a receipt in return, and this, together with all the signed portions of the ticket, is returned along with Part 2 of the garage sheet to the coke section which serves as a clearing house. It will thus be readily appreciated that at every stage in the execution of an order there is ample means of checking at any moment the exact position of every delivery. For instance, reference to the retained Part 6 of the ticket (which has been filed alphabetically) will show the sequence number of the order; a quick glance down the appropriate garage sheet indicates where the individual delivery should have been picked up; and a 'phone call to the garage foreman will immediately reveal where the delivery has got to—a few minutes' work in all.

In the event of a carman being unable to obtain access to any premises for the delivery of an order, he telephones the coke section with a view to finding out if there is a similar order in the vicinity to which the delivery can be transferred, thus obviating any avoidable returns of coke to the works. If a transfer is possible, a special diversion slip is made out to cover the transaction; if, on the other hand, the load has to be returned to the works an adjustment advice is sent to the coke section. There are, of course, certain standing orders which are dealt with specially—such as the Company's " all-in " contracts.

Accounting.

In the meantime the coke section is busy dealing with the accounting side of the order. Before the ledger portion of the ticket passes to the clerks for entry on the ledger cards it is checked with the returned No. 3 section to ensure that the customer has actually had the coke. The coke section never assumes receipt of a delivery merely on the knowledge that the ticket has left them intact. Unforeseen circumstances may have arisen in execution which prevent the delivery becoming a *fait accompli;* and although such circumstances are not common occurrences, the department run no unnecessary risk—for there is nothing more annoying to a customer to be " billed " for something he has not had.

Proof of delivery having been satisfactorily established from the signed portion of the ticket, the cash value entry on the ledger copy of the ticket is transferred to the ledger cards by means of machines, which carry forward any existing debits and credits and show the final balance due on the customers' accounts. As soon as all the deliveries for the previous month have been executed and proofs of deliveries are to hand, the ledger cards are balanced up and the amounts due from all credit customers transferred to the individual accounts, which have been duly " addressographed " during the few preceding days. Approximately 30,000 statements are sent out each month. This really completes the cycle of events so far as executing the customer's order is concerned. But the coke section's job is far from finished at this stage. Important people in statistical departments demand detailed in-

formation of tonnage handled each day, week, or month; accountants show a remarkable interest in the cash value of those tonnages; and the Coke Manager wants to know all about everything.

A considerable amount of care is therefore spent in summarizing the delivery totals, the various grades involved, the net cash receivable, and other items which are extracted from the garage sheets, having made due allowance for diversions, non-deliveries, and cancellations. All returned portions of the delivery tickets have to be bound up for reference. The totals obtained from the proof-of-delivery vouchers have to be subtracted from the gross totals arrived at in the earlier control stage in order to obtain the much-sought-after Final Net Figure. All this tabular work keeps a lot of people in the coke section very busy, but any elaboration of the details involved is hardly within the scope of this review.

The present efficiency has been brought about by careful planning and much detailed organization on which the Company are to be congratulated. It is a department which is ever growing—so much so that figures are apt to become out of date between the time they are written and when they finally appear in print. Nevertheless, the record figure of last March may, perhaps, be quoted as a final indication of the coke section's scope—50,000 tons delivered in the one month.

At the Head Office is the Coke Manager who co-ordinates supplies to meet demands in various districts, watching the markets, and acting as liaison officer between the Company and the London and Counties Coke Association.

In This Week's "JOURNAL" - - -

Flues for Instantaneous Gas Water Heaters.

Concluded this week is the Paper by Mr. Leopold Friedman (Chief Engineer and Manager of the Technical Department of Ascot Gas Water Heaters, Ltd.), on the subject of Flues for Instantaneous Gas Water Heaters, which he read before the Midland Junior Gas Association.
See p. 864.

A Study of Thin Tar Carpets.

Mr. W. E. Cone (Technical Adviser to the British Road Tar Association), in the course of a Paper read at a Plenary Meeting of the International Road Tar Conference held at Prague, outlines proposals which should provide an approach to the study of the problem of thin tar carpets.
See p. 870.

Newcastle and South Shields Amalgamation.

A proposal to amalgamate the Undertakings of the Newcastle-upon-Tyne and Gateshead Gas Company and the South Shields Gas Company was the main provision of the Newcastle-upon-Tyne and Gateshead Gas Special Order, which was the subject of Enquiry by Mr. J. F. Ronca, O.B.E. (Director of Gas Administration), at the Offices of the Board of Trade on June 3 and 4. The Town Councils of South Shields and Jarrow and the Urban District Councils of Hebburn and Boldon objected to the amalgamation on the grounds of disagreement with the provisions of the Order relative to the basic price system and the proposed basis of differential charge.
See p. 873.

Holding Companies.

The grouping movement which has spread so rapidly through the British Gas Industry in the last few years has given it, even if nothing else, a very great deal to talk about. Wherever gas men have gathered it has been a live topic of conversation. It has been roundly abused by some; it has been stoutly defended by others. But those who have regarded themselves as possibly next in order for purchase have, for obvious reasons, hesitated to come into the open with their views. Those who have been doing the purchasing have, until recently, not felt called upon to "talk" to any great extent, but have gone steadily forward with their plans with apparently ample supplies of capital behind them. Consequently most discussions of the subject have been of a behind-the-scenes order.

At the Institution Meeting this month Mr. G. M. Gill broke the ice with a Paper detailing the working of the Severn Valley Gas Corporation, Ltd., and Gas Consolidation, Ltd., two of the holding companies of which he is a Director. Shortly before the Meeting we had the opportunity of spending a day at the Head Office of the United Kingdom Gas Corporation, Ltd., where we found the Managing Director, Colonel W. M. Carr, and all his Staff ready to give us all possible information on the working of the group, and to do anything, in fact, towards removing any air of mystery, and even suspicion, which has grown up around the movement.

Is grouping going the right way, and in the way it is developing will it eventually save us from such bureaucratic control as is now threatening the electricity industry? The Gas Industry, we think, is moderating its earlier views and suspending judgment. It will be greatly assisted by such daylight as was afforded by Mr. Gill's Paper and discussion, and the interview with Colonel Carr which we publish this week.
See p. 857.

Choice of Correct Appliance.

At a "short Paper" meeting of the Yorkshire Junior Gas Association Mr. F. J. Pratten, of Shipley, emphasized what on the face of it is obvious enough—that if the consumer is to gain full satisfaction from gas service he must be supplied with the right appliance to fulfil his requirements. Too often, however, an unsuitable appliance is recommended by the salesman because he does not pay sufficient regard to the consumer's likely demands; and Mr. Pratten's observations on water heaters are in this respect much to the point.
See p .869.

City and Guilds Examination Questions.

Questions which were set in the City and Guilds of London Institute Examinations in various subjects are published.
See p. 871.

The Association of Statutory Inspectors of Gas Meters.

The annual meeting of the Association of Statutory Inspectors of Gas Meters was held on Wednesday and Thursday of last week. The business session over on Wednesday morning, members inspected the L.C.C. Gas Meter Station and Messrs. Smith Meter Works at Stannary Street. Subsequently entertained at luncheon by Messrs. Willey & Co., Ltd., the members were then conducted over the Streatham Works of Smith Meters, Ltd. On Thursday, the Association were the guests of the Mayor of Barking at luncheon, and the Gas Light and Coke Company, whose Beckton Works they inspected during the afternoon.
See p. 852.

Athletic and Social

Croydon Co-Partnership Meeting.

Long service awards were presented to thirty-four employees who had each completed twenty-five years' service when the annual meeting of the Co-Partners of the Croydon Gas Company was held at the North End Hall on May 25. Mr. William Cash (Chairman of the Directors) presided over an audience which filled the hall, and presented the report and accounts.

Mr. Cash announced that as a Coronation gesture the Directors had decided to grant an extra week's holiday to men who had served for over 25 years, which was already the rule with the staff. Seventy-one employees would benefit immediately.

The Committee reported that the bonus for the past year was maintained at the rate of 7%, as in the previous year, this being the rate of dividend paid on the Sliding Scale Stock of the Company for the year ended Dec. 31, 1936.

The bonus amounted to £14,072, an increase of £510 on the previous year, and, of this sum, £7,408 had been used to meet the remaining contributions to the Pension, Widows', and Orphans' Fund, thus leaving £6,664 available in the Co-Partners' Account for investment purposes and their own use.

A sum of £8,870 had been paid in during the year as savings, showing a reduction in this direction of £585, but there was an increase in savings from salaries and wages of £610.

The report reminded Co-Partners that for the Co-Partnership Scheme to achieve its original objects all members should consistently allow their bonus, or at least a major part thereof, to accumulate for investment, and should also make arrangements for saving by weekly or monthly instalments, for which every facility was available. At present the yearly rate of savings by deductions was, in all, £5,801. A sum of about £288 was collected for the Hospital Fund during the year, and payments to hospitals and ambulance associations amounted to £260. In addition a refrigerator had been presented to Croydon General Hospital, and the Company had contributed £251 to local hospitals during the year.

In presenting the report, Mr. Cash referred to a few of the main activities of the year, including the increase of wages last July, the issue by the Company in November of £103,883 4% preference stock, and the formation of a non-co-partners' provident fund linked with a savings fund. Another matter of interest was the erection of ten houses and twelve flats for the Company's own people at Waddon.

A biggish matter on hand was the carrying of a main out to the New Addington, where it was estimated that ultimately there would be four or five thousand houses. Sales of gas in 1936 showed an increase of 4½%, 132 million cu.ft. more than the figure of 1935. Consumers increased by 2,664, which meant that they topped the 100,000 figure. Another matter of satisfaction was the increased sale of gas for industrial purposes.

"What is the real object of this co-partnership arrangement?" Mr. Cash continued. "I suggest to you that the Directors and Officers, workpeople and office staff, are all of us together in the first place responsible to the stockholders, who are the proprietors of this business, and secondly responsible to the consumers, and that is the public, for the service we give. And, remembering that we are a public utility company, supplying what the public really needs and wants, it is our duty to give them good service as individuals and to serve to the best of our ability. The Directors on behalf of the stockholders, undoubtedly have a duty to perform in the care and well-being of the employees, and that is a duty which we try to the best of our ability to carry out." Mr. Cash concluded by saying there were people who scorned the co-partnership principle, but he contended that they were wrong. "We believe," he added, "that there is existing in this Company a team spirit which is of the greatest possible value."

Mr. W. Cash, Junr., in a witty speech, dealt further with the accounts. He assured the co-partners that their investments were extraordinarily safe.

A further report was given by Mr. O. Arnold, Chairman of the Co-Partners' Representatives on the Co-Partnership and Works Joint Committee. He congratulated the Directors and Management on the continued success of the Undertaking, and tendered to them great appreciation for the benefits which had again been derived from the working of the co-partnership system of employment. The number now working under co-partnership agreement was 1,109, or twice as many as when the scheme was instituted some 28 years ago.

After refreshments, an entertainment was given by the following artistes: Gladys Merredew, Olive Sturgess, Raymond Newell, Leslie Wilson, Arthur Askey, Carlos Ames, and Cyril Weller.

Association of Statutory Inspectors of Gas Meters

Following the General Meeting of the Association on Wednesday morning, June 9, the Members were the guests of Messrs. Willey & Co., Ltd., and Smith Meters, Ltd. On Thursday they visited the Beckton Works of the Gas Light and Coke Company.

ANNUAL GENERAL MEETING

By kind permission of the London County Council the eighteenth Annual General Meeting of the Association of Statutory Inspectors of Gas Meters was held in the County Hall, when the chair was taken by the retiring President, Alderman W. OUTON WILLS (Exeter).

In the course of his introductory remarks, the PRESIDENT recalled that it was the third year in succession he had the pleasure of welcoming municipal and administrative authorities and delegates to their annual meeting. He felt the Association required all the assistance administrative authorities could give them because they did not come into prominence as much as other departments. Since their last meeting they had lost four of their members—Mr. F. Colburn (Birmingham), Mr. W. R. Matthews (Worcester), Mr. A. M. Imrie (Dundee), and Mr. A. E. Watson (Sheffield). As a tribute to their memory, members stood for a short while in silence.

The HON. SECRETARY (Mr. C. P. Tatham, Nottingham) then read the minutes of the Annual General Meeting held on June 10, 1936, which were confirmed and signed by the President.

The adoption of the statement of accounts as presented by the HON. TREASURER (Mr. E. Simpson, Salford) was moved, seconded, and carried.

The annual report of the Council was presented by Mr. E. M. FOSTER (Exeter), who drew attention to the fact that the Association had lost two very valuable members by retirement. These two gentlemen—viz., Mr. J. L. Barry (L.C.C.) and Mr. J. E. Sloan (Coventry), would not be easy to replace. Mr. Barry having retired on superannuation would carry with him the best wishes of the Association that he might long be spared in good health to enjoy a well earned leisure, and with full recognition of his valuable service on behalf of the Association in so ably carrying out the duties of Hon. Treasurer since the inception of the Association in 1914, and playing a prominent part in the deliberations of the Council itself. Mr. Sloan had been an enthusiastic member of the Council for several years, and the Association would wish him well in his new sphere of activities. During the year the following changes in membership are recorded:

New Members Elected.—Messrs. E. J. Hattersley (Sheffield), A. E. Fazey (Birmingham), B. King (Edinburgh), A. Macdiarmid and A. D. Farquharson (Glasgow), A. W. Dix (Derby), W. Yeo and R. Stone (L.C.C.), J. R. Kelly (Dundee), and R. G. White (Coventry).

Associates.—Messrs. H. Robinson and R. Palin (Derby), R. W. Pearce, J. C. Willatts, and E. H. McDonald (Nottingham), and R. C. Edwards and A. E. Blick (L.C.C.).

On June 27, 1936, a communication was received from the Board of Trade stating that the Joint Committee dealing with the South Metropolitan Company's Bill was due to sit on June 30 and subsequent days, and asking if the Association was prepared to give evidence upon the proof previously submitted. Owing to the short notice it had been impossible to prepare a revised proof and Mr. Templeton (Leeds) attended on behalf of the Council.

The instruction from the last annual meeting that the Council should give effect to the resolution made thereat concerning a suitable token of appreciation being presented to the retiring Hon. Secretary (Mr. Templeton), and later including Mr. Barry, had been duly carried out.

Copies of the report of the last annual meeting, containing in full the Memorandum upon suggested Revision of the Gas Measures Acts, had been sent to the Authorities mentioned in that report and the replies received indicated that none of those bodies had any recommendations or comment to make upon the Memorandum submitted.

The report of the Council was unanimously adopted.

New Officers.

The Council nominated the following gentlemen as Hon. Officers during the year 1937-38:

President.—Councillor J. W. Willoughby, M.B.E., J.P. (Salford).

Vice-Presidents.—Sir Cornelius Chambers, J.P. (Birmingham); Mr. W. J. Armstrong, M.B.E., J.P. (Leeds); Alderman W. Outon Wills (Exeter); Bailie J. R. Coltart (Edinburgh); Mr. J. E. Lane, J.P. (Portsmouth); Mr. H. J. C. Davies (L.C.C.); and Mr. Wm. Gordon (Edinburgh).

Hon. Secretary.—Mr. C. P. Tatham (Nottingham).

Hon. Treasurer.—Mr. E. Simpson (Salford).

Moving the election of Councillor Willoughby, the PRESIDENT mentioned that before he had become a member of the Association, Councillor Willoughby had been President for two years and he (Alderman Wills) had experienced some difficulty in filling the Chair after so able a President as Councillor Willoughby. The motion was seconded by Mr. DALTON (Liverpool) and Mr. DAVIES (Salford), who referred to the great honour the Association had done Salford in asking Councillor Willoughby once more to occupy the Presidential Chair.

Left.—An old friend; Mr. W. Templeton (Leeds).

Below.—Members at the Stannary Street Testing Station.

The President then conferred the Jewel of Office on Councillor WILLOUGHBY, who, on taking the Chair, thanked the Association for having once again honoured him with the Presidency of the Association. The responsibility was indeed little with such an array of friends to help him, and he trusted his year of office would be as successful as that of Alderman Wills. He had great pleasure in presenting Alderman Wills with a Past-President's medal, which would serve to show how greatly they appreciated his services.

The HON. SECRETARY then read a letter which had been received from the Board of Trade, in which it was stated the Board would like to have the opinion of two of the Members (President and Secretary) on the new official seal for the certification of meters. The Secretary had replied that the Association wished to have the opinion of the members and he then passed photographs and impressions of the new seal down to the body of the hall for inspection. After considerable discussion the resolution of Mr. E. M. FOSTER to the effect that a letter be sent to the Board of Trade stating that the Association did not approve of the centre design and asking that the Board take no action until the Association had further considered the matter, was carried.

The meeting concluded with a hearty vote of thanks to the L.C.C. for the facilities placed at the disposal of the Association. This was proposed by Mr. HUME.

Visit to Gas Meter Testing Office.

The members then journeyed by motor coach to the Gas Meter Testing Office, Kennington, where they were received by Mr. H. J. C. Davies, Chief Officer, Public Control Department, L.C.C., who referred as a matter of interest to

the fact that this was the third Gas Meter Testing Station the L.C.C. had erected; it had cost £20,000 and represented the latest and best practice. There were twenty-eight pairs of test holders. In this station there were over thirty assistants on gas meter testing alone. After inspecting the station, particular interest being taken in the new holders recently supplied by Messrs. Willey, members proceeded through part of the premises of Smith Meters, Ltd.

Subsequently the Association were entertained at luncheon in "The Horns" Hotel, Kennington, on the kind invitation of Messrs. Willey & Co., Ltd., the Chair being taken by Mr. Stephen Simpson, Chairman of the Firm.

"The Association of Statutory Inspectors of Gas Meters" was proposed by the CHAIRMAN, who referred to the fact that he had been in contact with Gas Meter Inspectors for fifty years, and, therefore, he had seen some of the peculiarities of their ways. However, to-day, the Inspectors had got together and the joint experience they obtained had the happy result of the manufacturers knowing what exactly they had to put before the Inspectors. He, therefore, had much pleasure in giving the toast.

Councillor WILLOUGHBY replied in happy terms, recalling the Company's hospitality on the occasion of the Association's visit to Exeter.

"The Chairman and Directors of Messrs. Willey & Co., Ltd.," was honoured on the call of Alderman WILLS, who said that, having been born in Exeter, he could assure them the citizens looked upon the Firm as part and parcel of the City. Visitors to the City, he humorously suggested, might wonder how the citizens managed to make a living in Exeter; the reply to that problem was, of course, Messrs. Willey & Co. They all knew Mr. Stephen Simpson and were very grateful for his great generosity in entertaining them.

In reply, the CHAIRMAN said it was a pleasure to himself, and, he was sure, to his co-Directors, to learn that they were held in such high esteem in Exeter. The Firm had the pleasure of entertaining the Association at Exeter some years ago, and they thought the present time would be a good opportunity of entertaining them in London since their friend Alderman Wills was giving up the Presidency of their Association. He then said a few words with respect to the test holders his firm had made for the Gas Meter Testing Station the Association had just visited. These holders, he suggested, were unique, as they were the first holders in which all parts were interchangeable.

Visit to the Streatham Works of Smith Meters, Ltd.

After lunch the members were conveyed to the Streatham Works of Smith Meters, Ltd.

These fine works have had a phenomenal growth, consistent with the progress of the Company. Whereas in 1928 two bays sufficed, to-day there are over twenty-four occupied in the manufacture of meter components, for which purpose it is claimed to be the largest works in the world. For well over a century the House of Smith has provided reliable meters, and in its patented designs during that time has safeguarded the interests both of the Gas Industry and its consumers. The present Company was formed as Smith Meters, Ltd., in 1915, and since that date many patents have been taken out in connection with inventions relating to all branches of meter engineering.

Conducted by courteous and painstaking guides, the members were particularly struck by the careful testing adopted at all stages of manufacture to ensure a flawless product. This care and attention to detail has undoubtedly enabled the Company in large measure to preserve the good reputation which they earned in their earliest days.

At the conclusion of the visit the Association were entertained at tea at the Locarno, Streatham Hill, on the kind invitation of the Firm.

Visit to Beckton.

On Thursday the Association were the guests of the Mayor of Barking (Alderman Alfred Graham, J.P.) at luncheon in the Barking Town Hall.

The toast of "The Association of Statutory Inspectors of Gas Meters" was proposed by Mr. S. A. JEWERS (Town Clerk), who said it was significant that although meter inspectors had been contemplated for electricity supply, a decided case last year elucidated the fact that none had ever been appointed. That might or might not be a reflection on the electricity undertakings, but it was certainly a reminder of the very useful work which Statutory Inspectors of Gas Meters did perform in the interests of both the consumer and the Gas Industry. The PRESIDENT responded in lighter vein, thanking the Mayor for his kind hospitality.

Mr. E. M. FOSTER (Exeter) proposed the "Authorities Administering the Sale of Gas and Gas Regulation Acts." He recalled how well the Association had been supported by their Authorities; he particularly mentioned what very good friends the London County Council had been to them. The response was by Mr. R. J. B. MCDOWELL (London County Council).

"Our Host" was cordially given on the call of Alderman W. OUTON WILLS, who said they as Administrative Authorities were very proud of the Mayor both as a meter inspector and as a member of their Association. The MAYOR replied in a few happy words.

The members then left for the Beckton Gas-Works where they were the guests of the Gas Light and Coke Company. After inspecting the works the Association were entertained at tea on the kind invitation of the Company.

British Delegates to the I.G.C. Leave for Paris

A few of the 65 or so British Delegates to the 3rd International Gas Conference, under the leadership of Mr. H. C. Smith (President of The Institution of Gas Engineers), at Victoria Station prior to their departure for Paris last Friday.

GAS WARMS THE WATER AT THE TOTTENHAM LIDO

The provision of an ideal open-air bathing pool to replace the Old Marshes Bath at Tottenham has at last been accomplished, after very many set-backs to the scheme, and the new equipment includes a gas-fired boiler to maintain the water at a comfortable temperature, as well as various gas apparatus in the kitchen attached to the Pool.

The official designation is "The Tottenham Lido," which defines it to be a resort for healthy recreation, and given an abundance of fine weather, with plenty of sunshine, the Lido should prove a valuable addition to the Borough's many amenities for the improvement of the health of its people.

Officially opened on June 5, the Tottenham Lido is situated on an ideal site, with an open southerly aspect, the Administrative buildings being built on the north side, and the dressing accommodation blocks, which are ground floor buildings, enable full advantage to be taken of the sun's rays throughout most of the day.

The main building is set back 140 ft. from the highway, the forecourt being utilized for a car park. The length of frontage of the main block is 188 ft., the main entrance being in the centre and directly under the clock tower, which rises to a height of 47 ft.

The bathing pool, which is built of reinforced concrete, measures 165 ft. in length by 75 ft. wide, with the exception of the diving recess which is set back from the main south wall of the bath by 10 ft. for a length of 60 ft. This gives an area of 93 ft. by 60 ft. which is intended for water polo. The depth of the pool varies from 3 ft. at either end to 6 ft. in the centre on the north side, increasing to 10 ft. at a point 30 ft. from the south wall of the diving recess.

The total capacity of the pool is 490,000 gallons, and it covers a surface area of 1,484 sq.yd. There is an area for non-swimmers at either end of the pool of approximately 3,075 sq.ft. with a maximum depth of 4 ft. 6 in.

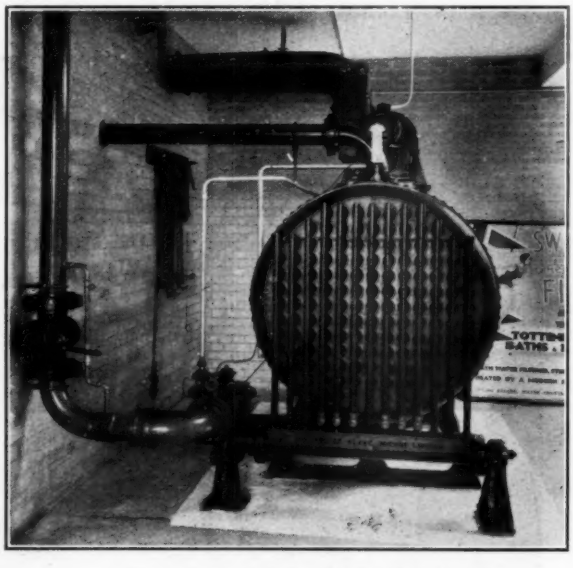
The provision of clean and sterile swimming bath water at all times is the aim of practically all municipal authorities to-day, and great advancement has been achieved in this direction. The old method of filling and emptying the bath every few days has been superseded by modern hygienic methods, which have received the approval of the Ministry of Health. Bath water can be maintained in a clarified and sterile condition almost constantly when being used by bathers. The system is of the latest type consisting of two horizontal type filters, each 9 ft. in diameter and 27 ft. 3 in. long, equalling a filtering area of 490½ sq.ft. The pumping process is carried out by two centrifugal pumps each capable of delivering 62,500 gallons per hour against a total head of 40 ft. each coupled directly to one 18 h.p. slip-ring induction type motor. The plant is capable of re-filtering the total amount of water in the pool every four hours at the rate of 239 gallons per sq.ft. of filtering area per hour.

Heating Plant.

With regard to the heating of the water, the Council felt that, although the proposition would be rather costly, it would be an incentive to those people not usually accustomed to open-air bathing to make use of the pool. With our variable English climate it is very rare that the water in open-air pools maintains a temperature of 70° for long periods, and the heating of the Lido water will be much appreciated, especially by non-swimmers.

After filtration a part of the water returning to the bath is by-passed through a size 6 H.W. "Controlled Flame" multi-tube horizontal gas-fired water heater with a nominal output of 2,000,000 B.Th.U. per hour. To avoid spoiling the building line the waste products are carried in steel trunking and discharged to atmosphere at the top of the tower in the centre of the building.

The Lido is provided with a gas kitchen where a double oven range, hot cupboard, toaster, poacher, and water boiling equipment have been installed. The domestic hot water is supplied from a gas-fired circulating boiler set.



The "Controlled-Flame" Gas Boiler.

Floodlighting, to enable bathing to be indulged in during the warm summer nights, is another innovation that should be much appreciated.

Careful consideration has been given to the design of the pool and buildings and to the materials used in the construction, with the idea of providing an establishment that will be in keeping with all the requirements for an up-to-date bathing resort for many years to come.

The United Kingdom Gas Corporation, Ltd.

The "GAS JOURNAL" interviews Colonel W. Moncrieff Carr, O.B.E., T.D., the Managing Director, and learns of the aims and objects of this holding company, and the means of rationalization by which it hopes to achieve them.

The idea of the holding company is by no means new to the Gas Industry even in this country, and one outstanding example has been accepted without comment or demur for many years as a sound and entirely justified concern, even, it might be said, as an institution among the gas supply enterprises of Great Britain. It was not until two or three years ago that the movement broke upon the Industry with the full force of several grouping companies, with apparently unlimited financial backing, scouring the country north, south, east, and west for possible purchases and securing them by dozens. The Industry, with the exception of the few who had thrown in their lot with the amalgamators, promptly decided that the whole system was strongly suspect and regarded the purchased as victims; argument broke out on every possible occasion, in high places as well as among the "rank and file;" and—the various groups went steadily on their way acquiring gas undertakings.

While there was no denying that the interests concerned had collected good brains from within the Industry, it was impossible to overlook the fact that in many cases the prime movement appeared to come from without. Add to this the fact that the big onslaught began at a time when investment rates were low, and when very large accumulations of capital were known to be seeking remunerative outlets, and it can readily be understood that the shocked Gas Industry cried "high finance," and protested that no good could possibly come of it for the Industry itself. The reply of the interested parties was to the effect that, of course, it was finance, and that they most certainly were not buying up gas undertakings right and left for the mere fun of the thing. On the other hand, they were not likely, they said, to be investing hundreds of thousands of pounds in this way unless they saw clearly that they could improve the prospects of the undertakings they were acquiring. And there the Gas Industry, quite frankly not being able to do anything about it, yet not without certain undefined though widespread misgivings, had to leave the matter to develop.

An Unnecessary Air of Mystery.

There has—quite naturally as we shall see later—been something of an air of mystery about the whole proceedings, and the "GAS JOURNAL" recently welcomed an offer by Colonel W. Moncrieff Carr to interview him at the Head Office in Manchester of the United Kingdom Gas Corporation, Ltd., of which he is, of course, Managing Director. Colonel Carr makes no secret of the fact that at the outset he was among the most critical of the sudden and widespread introduction of the holding company system to the British Gas Industry. He still holds strong views as to how it may justifiably be applied and how it may not—and who would not be, with the example of the United States utilities for all to see? But, whether or not it is fair to label him a convert, there is no denying the enthusiasm which he has for the methods employed by his Corporation, and no question whatever of his conviction that they are for the good of the grouped undertakings, and consequently the Gas Industry as a whole. Above all, he is anxious for the light of publicity upon the working of the system at which they are aiming, and the removal of the vague suspicions which are necessarily engendered by any air of mystery with which they may be invested.

Where Secrecy Cannot be Avoided.

There is, of course, a limit to the extent to which the veil can be lifted, as we appreciated as soon as we put our leading question to Colonel Carr. "Can you say anything as to any geographical plan to which you are working, and so dispel the impression which exists in many quarters that buying is more or less haphazard?" The reply to this question was that quite definite schemes are being pursued; and indeed a glance at the office maps, with the subsidiary undertakings marked with red flags, confirmed that several well-defined geographical groups already exist under the Corporation. But clearly no holding company can broadcast details of its future aspirations, since the result could be no other than that the shares of undertakings on the line of march would be cornered against them, and fantastic prices would be asked which would render purchase impossible. At least one outstanding case of this has already occurred, where a deal could not be carried through—to the disadvantage of the grouping scheme, and presumably also of the parties who had been "knowing" and had accumulated the shares. It may also happen, of course, that even without any intelligent anticipation of this kind the directors of a company have inflated ideas of its value, and for this reason purchase falls through. Another factor which enters into calculations is competition between holding companies. It may at times be justified; at others it may not. But it is certain that one undertaking cannot belong to two groups, and consequently in some cases the plans of one or other are frustrated. If we add the incidence of municipal undertakings and their usual reluctance to hand themselves over to private enterprise, we have about enumerated the factors which, in Colonel Carr's opinion, principally militate against ideal geographical grouping.

"Addressograph" plates are stamped at Head Office for the use of the constituent undertakings in correspondence with their consumers.

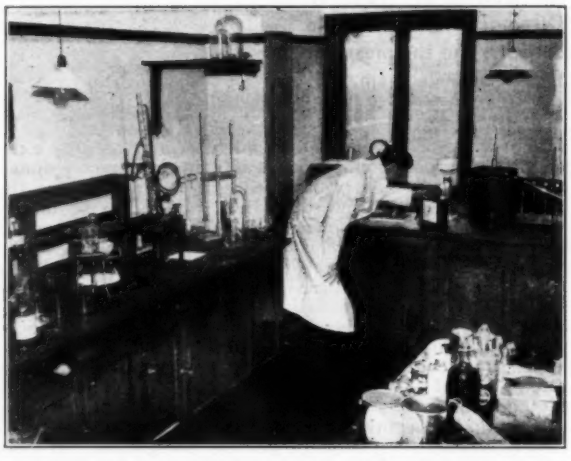
In spite of these handicaps he is, however, enthusiastic concerning the future. But one of the essentials, obviously, is to buy at the right price. It is easy enough to buy gas undertakings, he maintains, but it is very rarely that you can foresee economies which justify buying a profit at a *lower* rate than your money is costing you. If, for example, your capital is costing you 4¼%, you may be able profitably to buy an undertaking at a price which shows a return of 4½%, but in Colonel Carr's view 4% would be a very dangerous proposition except in quite unusual circumstances. And the profit must, of course, be a maintainable one, and is not by any means necessarily the same as the dividends which the undertaking has been paying in the days of its independence.

Into the question of the purchase consideration there enters the conviction that profits in the Gas Industry, and consequently its future prosperity and ability to serve the nation, are maintainable not through a high price for gas, but by attractive pricing and above all by improved service to the consumer. To the potentialities in these directions, the United Kingdom attribute the success they have already had in acquiring undertakings from several

municipalities, which would not have been possible had the latter not been convinced that their consumers would be better served by the change-over.

Services Which Can be Rendered.

This brings us to a consideration of what is the first and foremost benefit which a holding company can confer upon its constituent companies, and in Colonel Carr's opinion this is the provision of highly skilled specialists, particularly on the sales side, which is obviously beyond the resources of the smaller undertaking. He has the greatest respect for the engineering skill of the managers of to-day, and confidence in their ability to continue to produce good gas. But sales planning to-day is a very highly specialized business on the domestic side, and as regards central heating and industrial applications it clearly demands technical knowledge quite apart from skill in salesmanship.



In a very well-equipped Chemical Laboratory at Head Office work of many kinds is carried out for the subsidiaries—from oxide tests for the small undertakings to efficiency tests on gas appliances for the guidance of the central administration.

We were privileged at the United Kingdom offices to see examples of planned selling campaigns. They were centrally conceived and worked out in such detail as to provide for the individual undertakings all relevant facts and figures; the order of merit of prospects for the appliance in question according to their circumstances, professions, or trades; the particular arguments which would be likely to appeal to each class. In fact, all the data are prepared and tabulated in such a way as to enable a big sales push to " start with a bang " at the given moment, with the added force of being simultaneous over a large area of the country. In the words of Colonel Carr, " we are determined to cut out the old haphazard, chance methods of selling, whereby you put an appliance in the showroom window, did a certain amount of advertising, and hoped for the best. Display and advertising are excellent, but they must be co-ordinated with planned selling schemes. The latter must be worked out to the last detail, no matter what the line is, and carried right through if we are to get results."

Included also in the programme is training of salesmen, and of the salesmen of agents who are increasingly and successfully being included on the lines of " dealer co-operation." The Corporation is confident of results, and convinced that, if each scheme is begun and carried right through as planned, the records will reveal where any weakness lies, and why, if he is getting in, the other man is getting in at all.

On the industrial side the advantages to be derived by small undertakings from the resources of the parent are too obvious to require amplification, and, if the Industry is to obtain and retain all the load of this class which becomes available, the very best specialized brains will be required beyond the capacity even of some undertakings which are not in the " small " class.

Local Responsibility Must Remain.

With all the assistance which can be rendered to the subsidiaries, in whatever direction, by the central organization, it is fully appreciated at headquarters that the prosperity of the whole depends more than anything upon the efficiency of local managements. Colonel Carr made this point in his speech to the recent General Meeting, and he impressed most strongly upon us again that the last thing they intend to do is to interfere with the initiative of the officers in charge of stations. Every month a meeting is held at the head office at which they are taken into the confidence of the central administration, and at which full and free discussions of policy take place. We were shown, in confidence, a copy of the minutes of such a meeting, and while, of course, they are not for publication, they make it quite clear that the managers are not called together for the purpose of receiving orders or being lectured on the administration of a gas undertaking, but rather of pooling their knowledge and experience for the good of the whole. In the words of Colonel Carr: " We are working so that, while each man is definitely just as responsible for his own company as ever he was, he is working in and with the whole machine."

Buying Policy.

The freedom of the local manager to administer his own undertaking extends to the very important question of buying supplies.

Where standardization is possible central buying is carried out after consultation with Managers, and the whole of the financial benefit is passed direct to each Company. The only charge made for all services rendered by the central administration is a uniform charge per 1,000 cu.ft. sold, which charge is greatly reduced in respect of all gas sold at special rates to industrial undertakings, &c. Where standardization is not considered to be advantageous each Manager acts upon his own discretion in buying supplies.

Colonel Carr was prepared to discuss quite frankly the reaction of such an arrangement upon those who have to sell to gas undertakings. It means that advantages do certainly accrue to the very small gas companies, but he claims that no injustice to the suppliers is involved in organizing to buy, in that they are organized to sell. Moreover, this better buying by the smaller undertakings will undoubtedly enable them to increase their sales of appliances to a very material extent. In addition, the Corporation is able to offer the makers what, in Colonel Carr's view, must be the advantages of co-ordination not only of orders, but even of deliveries.

Will Holding Companies Become Manufacturers ?

We asked Colonel Carr the straight question, which has been, and is, exercising the minds of many in the Industry, whether he could visualize his holding company going into business, in any shape or form, as producers of plant or appliances for the use of its own subsidiaries. We found that he holds very strong views that anything of the kind would be entirely outside the scope of the Corporation's policy. In what he calls their own line of business they have quite enough in prospect to keep them fully occupied for years to come, without any need to launch out into trades in which, as a result of years of experience, others are able to give service of the very highest class. Moreover, it would be the height of folly, in his view, to cast lightly aside the very great advantages which the whole Gas Industry derives from the splendid rivalry and competition between existing firms of manufacturers.

Plans are drawn, printed, and filed at Head Office, where facilities are available for giving even the smallest undertaking the most modern service in this respect.

A further development on the supply side is the provision of central storage for appliances. A small beginning has been made in Leeds, Manchester, and Scarborough, and it

is easy to see that such a system might well be extremely valuable in certain circumstances. But perhaps the outstanding benefit derived by the subsidiaries from the very beginning was the placing of a large scale contract for material for works and mains development, which enabled them forthwith to put in hand work which was highly desirable, but which might not have been possible from their own resources.

Standardization of Selling Prices.

While on the subject of buying policy, there is one other point in sales policy to which reference may conveniently be made. The Gas Industry has long lamented the diversity which exists in terms for simple hire, hire-purchase, and outright sale of gas appliances, and while in some districts a beginning of uniformity is being made by other means, the United Kingdom see in the holding company great possibilities of extending this very desirable reform. The whole position is being investigated, and in the meantime they have been able to put out in all their undertakings an all-enamel, thermostatically controlled cooker on hire-purchase at a very competitive price. It is not completely standard, because the local manager has a number of makes from which he can choose, but the terms are standardized, and the cookers strictly comparable. It would appear likely that such standardization must be of benefit also to the makers.

Pooling of Staff.

Talk of standardization leads us back once again to the question of personnel. It is intended, for example, to introduce standard scales of commission on sales for the benefit and encouragement of all grades of the " contact " staff. The details of the scheme are not yet complete, but we understand that it is to be based on load-building principles, and not upon first cost of appliance. Beyond this, as changes become necessary within the individual companies, they will be asked gradually to work towards uniform scales of remuneration for all equal jobs. The advantages of this are claimed to be twofold. From the individual's point of view it will facilitate promotion within the Corporation; and Colonel Carr insists most strongly that this is the policy as far as ever possible, and that their employees can be quite sure that opportunities of promotion for the good man are greater than they would be in any individual company. Secondly, and from the Corporation's viewpoint, standardization of this kind will facilitate temporary interchange of personnel which may be most useful in certain circumstances. There is the matter, for example, of urgent works repairs and of mainlaying jobs; there is the consideration of the effect of " seasons " on the business of centres like Scarborough and Harrogate, and of special shopping weeks anywhere; and of agricultural and other shows. It is easy to see the benefit to be derived from the easy transferability of key men and skilled labour.

Head Office Services.

This is apart altogether, of course, from the head office specialists, to whom reference has already been made. Other central services which should be briefly mentioned include a splendidly equipped laboratory, which carries out anything from oxide tests for the smallest companies to efficiency tests of appliances. At headquarters also we saw beautiful work being turned out in a well-fitted drawing office, which is quite evidently kept fully employed by the constituent companies.

Mention must also be made of the central administration accountancy department, which is under the supervision of the Company's Consulting Accountant. One of the principal tasks upon which this office is engaged is the organization of groups in which mechanical billing is carried out by one of the larger companies both for its own consumers and for those of the smaller ones in its neighbourhood. The individual concerns will, of course, continue to read their own meters, and so will not lose personal touch with their consumers, but the economies of large-scale mechanical accountancy should be substantial. The accountancy department has also standardized the form of accounts rendered by the subsidiaries, so that their results are readily comparable, and so that it can be seen, for example, that none lags behind in making a claim for any income-tax allowance which another obtains. It acts also in a general advisory capacity, distributes memoranda on such questions as hire-purchase finance, and has even been known to send staff to the rescue of the companies in time of emergency or special stress. It is engaged at the present time upon a particularly interesting piece of work —the actuarial organization of a superannuation scheme which is to cover the whole of the employees of the companies.

To Sum Up.

We have endeavoured to summarize the impressions we gained, from a most interesting day at the central offices of the United Kingdom Gas Corporation, of the lines upon which this young holding company is planning its organization. It does not pretend to be in business for " the good of its health " nor even out of pure affection for, and concern for the future of, the great Gas Industry. It does, however, claim that the measure of rationalization which it is able to introduce will be of benefit to its subsidiary undertakings, and so to itself. Incidentally such benefit, if any there be, must also prove of benefit to the whole Industry on the old analogy of the strong and weak links in the chain. We advisedly say " if any there be," because in this article we have not attempted to be critical in any way, but rather to record facts as they were shown to us. We place it on record that all the members of the staff whom we were freely allowed to interview gave us the impression of fully confirming Colonel Carr's words when he said " we make no secret of our plans; no secret of what we are trying to do. It is all above board. We have nothing to hide in any shape or form."

Trade Notes

Gas Cock Lubrication.

The importance of the periodical lubrication of gas cocks is a matter to which considerable attention has been given of recent times. As manufacturers of gas cocks for use with their " Newbridge " clock controllers and gas switches, the Horstmann Gear Company, Ltd., have given careful consideration to the subject of suitable lubricating oil which will not become gummy or cause corrosion of the metal with which it comes in contact. The firm are now marketing an oil which is particularly suitable for such applications; it is known as " Newbridge Gas Cock Lubricant," and has been evolved in collaboration with Messrs. C. C. Wakefield & Co., Ltd. It is also suitable for any type of plug valve, and is supplied in handy 4-oz. tins which are sealed and cannot be refilled, thus obviating the possibility of their being replenished with inferior or unsuitable oils.

Henry Wiggin & Co., Ltd.

The use of thermostatic devices is now being developed on a wide scale and the need for metals which respond to temperature changes is growing correspondingly. In order to meet the varied requirements of users on this side of the Atlantic, Henry Wiggin & Co., Ltd., has made arrangements with the H. A. Wilson Company, of Newark, N.J., to handle this latter Company's full range of thermostatic metals in Great Britain and the rest of Europe. This range at present includes fourteen types of Wilco Thermometal. In due course the complete range will be rolled at their Birmingham Works. The products will be known in Europe as Wilco-Wiggin Thermometal. Readers at present using such devices or wishing to consider their adoption are cordially invited to make full use of the help which the firm, whose address is Thames House, Millbank, S.W. 1, are prepared to give.

Cochran-Kirke " Sinuflo " Gas-Fired Boilers.

An informative booklet has been issued by Messrs. Cochran & Co., Annan, Ltd., describing the Cochran-Kirke " Sinuflo " gas-fired boiler. The publication is a rational exposition of the scientific application of town gas to industrial boiler plant.

Having dealt with general considerations of gas firing, the booklet goes on to describe the " Sinuflo " gas-fired boiler. It is pointed out in the earlier part of the booklet the conditions under which it *pays* to use gas as a fuel; the most important of those conditions is that the boiler should be of the right kind. The Cochran-Kirke boiler, it is claimed, is of the right kind and that it fulfils the necessary conditions. In the old days of experimenting, it is recalled, it was well-known that gas fuel could not be used efficiently unless the heat could be made to *impinge* on the surfaces to be heated. Further, it was known that good results could not be obtained unless the intervening space between the heat and the water were as thin as possible. The patent " Sinuflo " tube has changed all that, and it is now possible to have continuous impingement throughout the whole length of the tube, and the tube itself being comparatively thin allows the heat to pass easily into the water. Clear diagrams and explanatory matter describe the Cochran-Kirke gas-fired steam boiler which is fully automatic as regards such features as gas pressure and control, flue damper, low water level gas cut-off, and flame failure thermostat. The " Sinuflo " principle, already familiar to the majority of our readers, is fully explained, and the publication concludes with technical considerations regarding the use of gas as a fuel under different conditions.

Flues for Instantaneous Gas Water Heaters

by
LEOPOLD FRIEDMAN
(Chief Engineer and Manager Technical Department, Ascot Gas Water Heaters, Ltd.)

From a Paper read before members of the Midland Junior Gas Association at a meeting held on Thursday, April 1—Mr. F. A. JENKINS (Leamington), the President, in the chair.

(*Concluded from p. 565*)

An additional air inlet to each flue was provided, and values were taken for operation with this inlet closed and open. The results obtained are plotted in the curves in fig. 30, the full curves giving the results for the appliances working with the additional air inlet open, and the broken curves with the additional air inlet closed. It will be seen that this air inlet has little effect on condensation in both cases, and it is safe to assume that the provision of an air inlet so as to increase the excess air content in the flue is useless in practice, especially for appliances incorporating

It may be interesting to note that in the experiments just described, in spite of the large condensation present, the flue gases were completely evacuated. The total aqueous content of the flue gases in this instance was 5,200 grammes per hr., which means that with the flue height of 12 metres, nearly 70% of the total water vapour was condensed. This proves the useful fact that condensation has very little influence on the energy available for the evacuation of the flue gases to the outside atmosphere. A further experiment was carried out to discover the effect

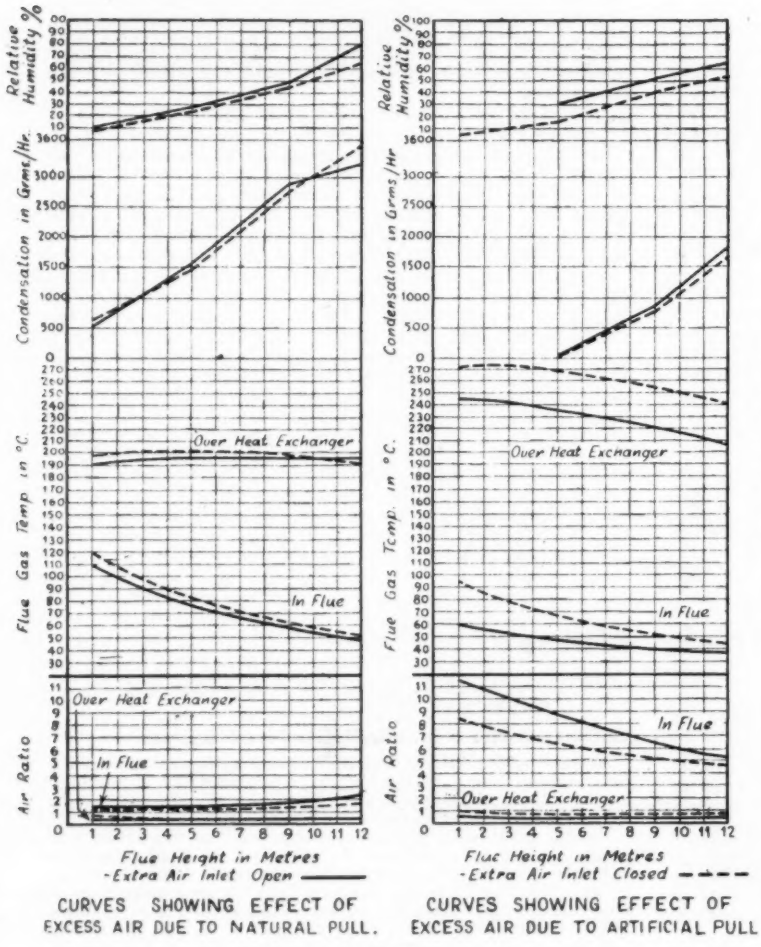


Fig. 30.

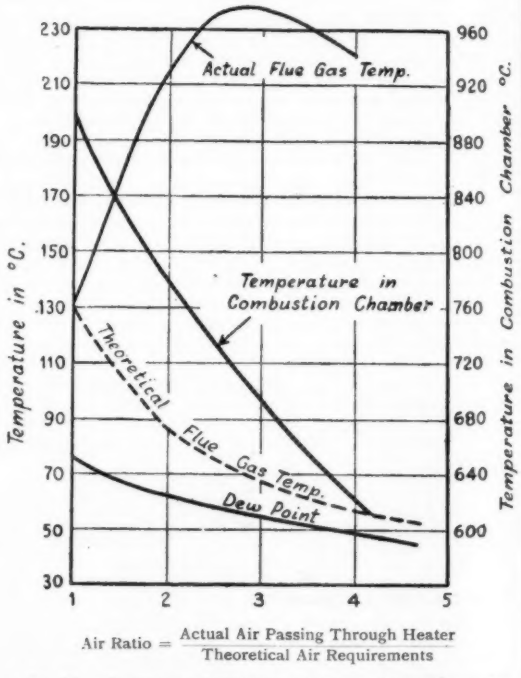

Actual Flue Gas Temp.
Temperature in Combustion Chamber
Theoretical Flue Gas Temp.
Dew Point
Temperature in °C.
Temperature in Combustion Chamber °C.
Air Ratio = Actual Air Passing Through Heater / Theoretical Air Requirements

Fig. 31.—Curves showing Effect of Excess Air on Operation of Instantaneous Gas Water Heater.

efficient draught diverters. One can also see that for values of increased excess air, due to natural pull, the effect on condensation is slight, but increases when the injection effect of the artificial draught raises the proportion of excess air to theoretical air requirements above three. Thus for a height of 12 metres the condensate collected per hour was 3,600 grammes for an air ratio of 2·3, whereas, for the same height of flue with artificial draught, inducing a ratio of 5·3, the condensation is only 1,750 grammes per hour. We can conclude, therefore, that condensation can be minimized or even eliminated by the addition of excess air, but the injection effect which is produced by natural pull is not sufficient to reduce condensation to any appreciable effect.

of increasing the air ratio passing through the combustion chamber of the heater itself on the dew point. Fig. 31 shows the results obtained. An interesting point to note is the complete variance between the theoretical and actual temperature of the flue gases. I attribute the peculiar behaviour of the actual temperature curve to the following: Owing to the cooling of the hot gases by the introduction of excess air, the heat transfer in the heat exchanger is at first impaired, with the result that the efficiency of the heater is decreased, and the heat content of the flue gases is therefore higher. On the other hand, the velocity of the gases through the heat exchanger is also increased, until, with an air ratio of 2·75, it reaches a critical point at which the thickness of the static film

rapidly decreases and the heat transfer and efficiency are greater, with a consequent decrease in the temperature of the flue gases. This experiment shows that it would, in fact, be possible to reduce condensation by increasing the air ratio in the appliance itself, but this would not be economical in practice, because the efficiency of the heater would be lowered.

As is to be expected and borne out by the curves in fig. 30, in spite of the fact that heavy condensation occurs, saturation of the flue gases is never reached—*i.e.*, the condensation is due to local cooling at the walls of the flue only. Fig. 32 shows temperature and relative humidity curves in the centre and close to the walls of a flue connected to a gas water heater. It can be seen that the temperature difference is appreciable, and that at the height of 10 metres the relative humidity at the walls is 100%, whereas in the centre is only 28%. Fig. 33 shows the temperature traverse for a 4-in. galvanized-iron and asbestos cement flue at different heights. Mr. Masterman suggests* that a way to reduce condensation is by disturbing the streamline flow of the flue gases, thereby evening out the temperature throughout the cross-section. The

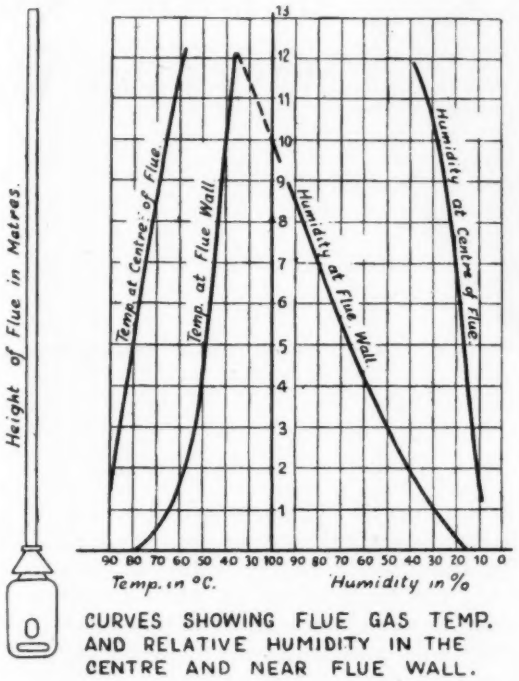

Height of Flue in Metres.
Temp. at Centre of Flue
Temp. at Flue Wall
Humidity at Flue Wall
Humidity at Centre of Flue
Temp. in °C.
Humidity in %
CURVES SHOWING FLUE GAS TEMP. AND RELATIVE HUMIDITY IN THE CENTRE AND NEAR FLUE WALL.

Fig. 32.

table below shows results obtained when a disturbance in the form of two 90° elbows was introduced into the flue:

TABLE 4.

—	Mean Edge Temperature.	Highest Temperature of Flue Gases.	Maximum Temperature Difference in Flue Gases.
	°F.	°F.	°F.
Before	172	329	157
Between.	239	313	70
After	245	291	46

Unfortunately, in a built-in flue, it is seldom that this arrangement can be practicably employed, also the disturbance caused would decrease the thickness of the stagnant film, thereby increasing the temperature and possibly nullifying the advantage obtained by the higher wall temperatures.

From the above it can be seen that condensation in flues cannot be avoided, and the two questions that are of interest to engineers are:

(*a*) Means of leading away the condensate from the flue.

(*b*) Suitable materials for the flue which will withstand the attack of weak sulphuric acid.

* "Combustion, Wind, and Flue Equipment," by C. A. Masterman, 1930.

Condense Traps.

The problem of providing a suitable condense trap for outside flues is not difficult, and a popular effective method is illustrated in fig. 34. Suitable caps are manufactured from asbestos cement for this purpose, and a drain hole can be drilled, or the condense can be left to evaporate.

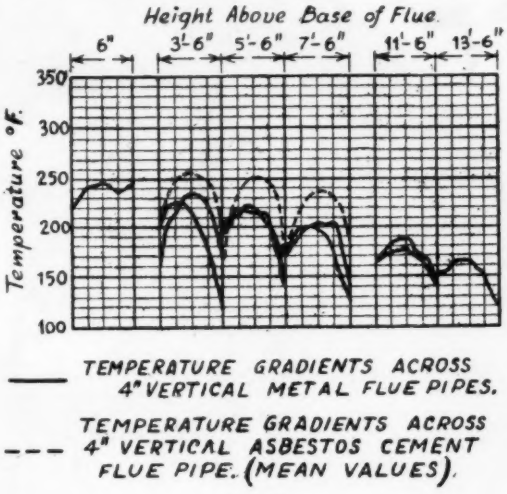


Fig. 33.

[Reproduced by the kind permission of C. A. Masterman from his Paper "Combustion, Wind, and Flue Equipment."]

It is only wise to permit the latter on short flues, where condensation is not heavy.

For built-in flues it is best to provide a lead condense trap with a pipe taken to the outside of the building or the nearest drain. Another excellent way of preventing condensation from flowing back into the draught diverter

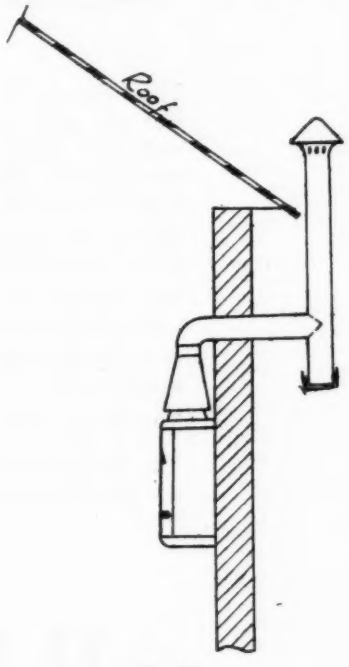


Fig. 34.

is shown in fig. 35. This consists of a special asbestos cement bend which incorporates the trap, and from the bottom of which a condense pipe is led to the nearest drain. The pipe illustrated is installed in a block of flats where the height of the flues vary between 10 ft. and 45 ft. and where condensation is heavy.

Conclusions.

Before giving the conclusions, as far as it is possible to arrive at these, I would like to draw attention to the fact that for a gas appliance the ventilation of the room is perhaps even more important than the evacuation of the

Instantaneous supply of HOT WATER

TO KITCHEN SINK, WASH BASIN, ETC.

The "Prestot" is now supplied in two forms. The Standard form has hot and cold water taps neatly finished with bakelite covers, coloured red and black respectively. By the use of these, water at any temperature from cold to very hot can be obtained at will. Other features include the bye-pass safety device; automatic gas and water valve; rust-proofed cast iron burner with independently fixed burner jets; combustion chamber of the non-condensing type; flexible fixing.

The Alternative form has a single hot water tap, and is normally for use where more than one water tap is already available at the sink. It is further equipped with a swivelling chromium-plated outlet spout attachment.

The water can be used for culinary purposes, whether hot or cold.

The finishes are white, green or blue porcelain enamel. The fittings are chromium-plated.

Full particulars and descriptive literature obtainable on request.

☆ PRESTOT ☆

INSTANTANEOUS WATER HEATER

R. & A. MAIN LIMITED, LONDON AND FALKIRK

London Office and Showrooms: 48, Grosvenor Gardens, S.W.1. Glasgow Office and Showrooms: 82, Gordon Street.

products of combustion from the flue. For, even if all the products come back into the room, and there be ample ventilation, dangerous conditions will not arise.

For this reason the following general rules should always be carefully considered:

1. The ventilation of the room can be carried out by means of air bricks. The building regulations specify that, for a bedroom without a flue there shall be at least 100 sq.in. of clear vent space. This similarly applies for bathrooms, &c. These air bricks are best spaced out with some at floor level, to provide the incoming air, and some at ceiling level, to remove the vitiated air, if any.

2. The gas appliance should be installed as near as possible to the available flue, and long horizontal runs should be avoided.

3. In cases where the flue pipes or chimneys are not circular the flue area should not be less than specified by the manufacturer.

4. Where horizontal lengths of flue or changes in direction are encountered, the vertical length of flue immediately following the draught diverter should be as long as possible.

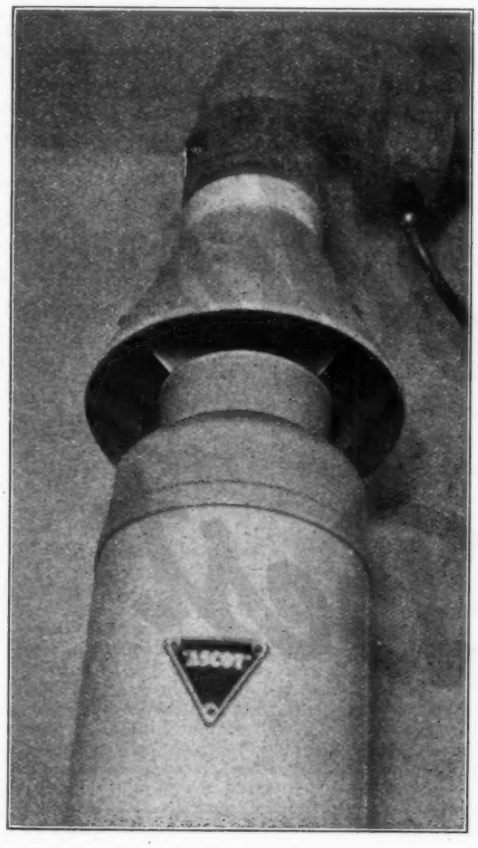


Fig. 35.

5. Changes in direction should be produced by means of obtuse bends. The use of 90° bends should be avoided.

6. The whole flue pipe installation should have a rising tendency.

7. When terminating a flue pipe in the chimney, this should be brought about by entering the chimney from a vertical rather than a horizontal angle.

8. The connection between the lengths of flue pipe and the chimney should be made in such a way that no reduction of the cross-sectional area is affected.

9. The flue pipe must have the same diameter as the flue socket of the appliance, and be in accordance with the size given by the manufacturer.

10. When there is liable to be condensation in the flue pipe steps should be taken to prevent this running back to the draught diverter of the appliance by means of an obtuse tee or otherwise.

11. Suitable materials are asbestos, cement, lead-coated iron, or vitreous enamelled iron.

12. Chimneys should not, if possible, be built on outside walls. Co-operation of architects and builders for the provision of special flue chimneys is desirable.

13. The chimney should terminate above the eaves of the roof, and must not lie in the shade of adjoining buildings, trees, or other chimneys.

14. The material for the chimney should be of small thermal capacity and bad conductivity, and as far as possible it should be non-absorbent. Inside surfaces must be smooth, and sufficiently anti-corrosive.

15. Termination of flue pipes in false roofs, although occasionally satisfactory, is not to be recommended.

16. When terminating through a wall, of necessity the further the terminal is away from the wall the better.

Discussion

The PRESIDENT (Mr. F. A. Jenkins, Leamington) said, while the subject was of special interest to distribution members, he thought that those members more particularly concerned with gas-works' practice would realize the problems he had dealt with were very similar to those which were met with on the works. He referred particularly to the effect of the differential temperatures in the flues and retort settings. The very old flue terminal mentioned was an interesting point in view of the great alteration which had taken place in dealing with the theory of wind pressures. He said that when he was studying the design of buildings, wind pressures on buildings and roofs were shown as being distributed evenly over the windward side of the roof. Since those days, the study of wind pressures had advanced considerably, and it had been found that instead of the pressure being evenly distributed over the whole area, a *minus* pressure was set up. The effect of this, he thought, must be very helpful in getting satisfactory results with gas appliance flues. Mr. Friedman had dealt with the question of air inlets, which was particularly important in connection with high consumption heaters fixed in small rooms. It was not much use providing a satisfactory flue if there were not sufficient air going into the room to complete combustion. In most towns the by-laws stated that if a flue were not provided, there must be an air brick of at least 81 sq.in., but he personally had never seen such an air brick. He had noticed that it seemed to be the usual practice, particularly among speculative builders who often fixed gas appliances themselves, to terminate the flue in the roof space, and in spite of what Mr. Leopold Friedman had said about freedom from fatal results, he would like his opinion on this question.

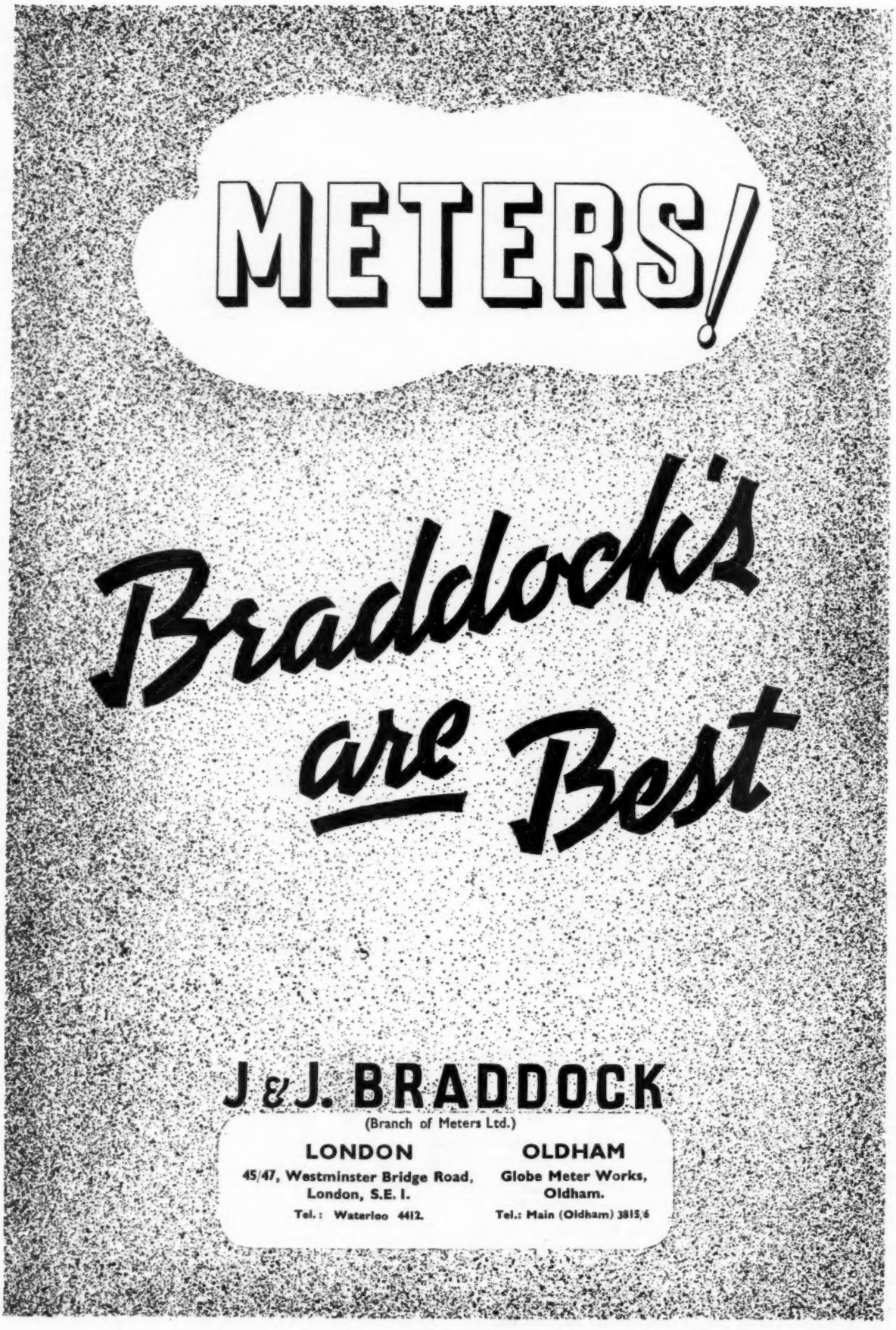
Mr. E. T. PICKERING (Birmingham) was impressed with the attractive appearance and the thermal efficiency of modern gas appliances. The question of flues, while not so obviously important to the purchaser, was of vital importance because on it depended the safety and correct functioning of the apparatus, and he presumed the question of flues had not been made any easier by increased thermal efficiency. The man on the job had to decide what size and type of flue to install and would be indebted to Mr. Leopold Friedman for this Paper.

Mr. W. N. SMIRLES (Birmingham) emphasized the difficulties in connection with the fixing of flues, and although the people who were concerned with the working of flues could do quite a lot in the way of correct design of baffles and terminals he thought it would be agreed that each installation was a separate problem and must be treated as such by the man on the job. Referring to the various experiments carried out by Mr. Friedman, he asked if the conditions prevailing in the ones in which he blew air horizontally across the top of a flue were similar to the conditions found in actual practice. He was very interested in the diagrams showing the importance of minimizing the resistance of all flue equipment by interfering as little as possible with the upward flow of the gases. He noticed that in fig. 27 Mr. Friedman had taken a certain point as the maximum, and it occurred to him that the point chosen was a purely arbitrary one and that it might have been taken in any other position. He had recently carried out some interesting experiments upon temperature gradings in flues, which illustrated the remarks made by the Author in regard to the effect of increasing the diameter of flues and condensation. These experiments had shown that in the walls of the flue there was a place where the gases were stagnant, and on account of this stagnation condensation was more likely to take place. With a large diameter flue there was a greater tendency for stagnation, and more condensation was the result.

Mr. S. K. HAWTHORN (Birmingham) said how interested he had been in the lecture; he was reminded of experiments he carried out some years ago in connection with the flow of gas in pipes, particularly in its relation to pressure loss due to bends, tees, &c., when he found that the resistance of a quarter bend was very considerable compared with an obtuse bend. A strange thing he had noticed was that if the gas were to pass through a pipe with blind branches through which no gas was flowing, considerable resistance was thrown by the mere fact of the branch being there, and he asked if Mr. Leopold Friedman could offer any explanation of this.

Mr. S. BROCKBANK (Walsall) referred to the difficulty he had experienced with soot entering the flue pipes, and asked if the speaker knew of any means of overcoming this trouble.

Mr. W. L. S. SPINKS (Birmingham) referred to the question of terminating flues in the roof space and suggested that a practical point to be borne in mind was that if this were done it would inevitably set up nail rot. Any condensation from the appliance would settle on all nails in the roof and would quickly rot them. Apart from that there was always the possibility of getting down-draught. Referring to the question as to how far the flue terminal should be away from the wall, he said that the Swiss Gas Association had issued illustrated regu-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lations on flue equipment and they showed the tees terminating quite a distance from the wall. It was a very ugly arrangement, and, in his opinion, was somewhat impracticable. He advocated the use of vitreous enamelled flues and thought that this type would be increasingly used.

Mr. UNDERHILL (Burton-on-Trent) asked how ventiles compared with the special terminal shown in the Paper.

The Author's Reply.

Mr. LEOPOLD FRIEDMAN said, in reply to Mr. Jenkins, he could not claim any detailed knowledge of flues in retort settings, but he would emphasize the most general application of these experiments. Referring to Mr. Jenkins' latter remarks with regard to wind pressures, he said he would show a series of wind pictures—these being obtained by placing model houses in a stream of moving fluid and the stream line flow being noted by mixing in some non-transparent finely divided solid; he asked them to note the position of turbulence. Now, these positions of turbulence could not be suitable for flue terminals due to the uncertain pressure conditions at these points. He was glad that Mr. Jenkins had emphasized the importance of adequate air inlet; it was a point sometimes overlooked, and here again they must attempt to obtain the co-operation of architects and builders. Referring to the conclusions in his Paper, he had given his opinion of the termination of flues in the roof space as follows: The termination of flue pipes in false roofs, although occasionally satisfactory, was not to be recommended. He agreed with Mr. Jenkins when he mentioned the question of increased thermal efficiency; few present-day heaters had an efficiency of much above 80%, for, should the efficiency be increased excessively, a fan would have to be provided to remove the products of combustion.

Replying to Mr. Smirles, he had mentioned in his Paper that the experiments performed dealing with wind blowing from a tube, were not supposed to be comparable to those actually met with in practice, but were rather an analysis of the latter. The point indicated in fig. 17 was, he agreed, rather arbitrary within a small range; it had been chosen as a mean figure between the smallest possible area—*i.e.*, where the curve was vertical, and the largest economical area—*i.e.*, where the curve was horizontal He was very interested in the experiments carried out by Mr. Smirles, and referred to the section of the Paper which he had neglected to read where these points were dealt with, figs. 25 and 26, giving the unexpected result that, for these experiments, condensation was less with a larger than with a smaller flue. He did not think that there was any great difference in the problems of flues for condensing and non-condensing appliances; it was rather a question of degree.

He wished to thank Mr. Hawthorn for his comments on the effects of bends and tees which he found very interesting; he thought that these experiments applied to flue gases just as much as to town gas. The effect of blind branches was well worth study, and he thought it might be due to the setting-up of eddies and to the alteration of the stream line flow.

Mr. Brockbank had referred to soot entering flue pipes; he agreed that this was a difficulty when entering old coal fire chimneys from a vertical angle, but this could sometimes be overcome by using a deflector plate causing soot to pass round the sides or by cutting the flue pipe at an angle so that the top projected further into the chimney than the bottom.

Replying to Mr. Spinks, he agreed with all the latter had said, and mentioned that the Swiss Gas Association still recommended the open tee as a terminal, but he could not see its advantages.

The special terminal mentioned by Mr. Underhill was a comparatively recent introduction, and their tests on it were as yet incomplete.

Yorkshire Junior Gas Association

Short Paper Meeting

A meeting of the Yorkshire Junior Gas Association was held at Halifax on Saturday, May 22, when three short papers were presented. Extracts from two of these were given on June 2; the other is dealt with below.

Choosing the Correct Appliance

By F. J. PRATTON, of Shipley

I propose in this Paper to deal with domestic hot water. Ten years ago, hot water in abundance in the ordinary type of house was a luxury, even though a bathroom may have been included in the plans of any dwelling at that time. The hot water system was not efficient and its running costs were such that great care had to be taken with the use of the hot water system to maintain economy. The desire to have plenty of hot water, at any time day or night, is not, of course, new; this need has always been prevalent, but could not be applied on a national scale for several reasons, chief of which, I think, was lack of suitable appliances to fit individual needs, and varying circumstances in different parts of the country.

Now, however, we have a host of appliances from which to choose, and which will ensure satisfaction in peculiar or ordinary circumstances. Manufacturers of the various hot water appliances have given thought to foolproof and more efficient designs, and in turn we should give these appliances every possible chance to do their job in the most satisfactory manner, thereby ensuring satisfied consumers. This, in turn, will increase the hot water load.

These conditions can only be satisfied by careful consideration of each consumer's requirements, and the correct choice of appliance. It is important to note the needs (in terms of hot water) of each prospective consumer, no matter what type of house or building.

We hear many opinions as to which is the better, the instantaneous or the storage water heater. I do not think it wise to take sides on this matter. The instantaneous type of heater has very much to be said for it, but it is not possible to desert the storage heater entirely, or, shall I say, the storage system. The instantaneous heater is so simple to operate and so entirely automatic, but it is sometimes a wise step in choosing the best appliance for a particular job to shelve this simplicity and ensure more satisfactory results by choosing a storage, circulator, or quick recovery type of heater.

Whilst requiring some time to heat the amount of water needed for a bath, the quick recovery heater has a quick delivery in terms of gallons per minute—an obvious asset. Of course, it is at the coldest period of winter that a badly chosen appliance becomes particularly annoying, to both consumer and undertaking. No matter what appliance a prospective customer has in mind, make your own decision as to the correct type necessary, and stick to it. This needs patience and tact, but if your prospective customer has seen, say, an instantaneous multi-point heater working somewhere, it does not follow such a heater will suit his conditions. Some consumers can cause a lot of trouble on such a problem as this. Be careful when thinking of installing an immersion heater; this is a good unit, but unsuitable for some jobs.

Tea Making, &c.

To ascertain the measure of satisfaction in the making of tea, coffee, &c., it is not so difficult, if one has chosen the right type of appliance for any installation.

Tea making needs boiling water; and there are gas appliances capable of giving plenty of boiling water to suit any individual consumer's requirements. I strongly advise, wherever possible, the fixing of a boiler of the steam generating type, working at about 2 to 3 lb. per sq.in. steam pressure. The smaller type open design, while raising water to 212° F., when fixed for convenience some distance away from the drawing point has a tendency to lose some heat, a fact noticed quickly in the drawn pot of tea.

The steam generating canteen appliance entails a bigger capital outlay but pays for itself in the long run. The initial outlay can be kept down to a reasonable minimum by careful choice of type for the installation, and I do not think it is wise to "get in," for the sake of consumption or on grounds of loss of sale, with a cheap appliance. The fitting of a cheap appliance, which generally has to work at full load, will in a good many ways reduce a consumer's measure of satisfaction, and this cannot enhance a gas undertaking's prestige. To-day, if a prospective consumer approaches a gas undertaking for advice on his requirements, he has usually faith in the advice given; this faith should be fostered in every way possible.

Hot Water for Baths.

An enquiry for an appliance to supply hot water for a bath is apt to be made into an "ordinary" enquiry; yet the advice given on this matter should be the best possible by any representative of the undertaking.

I would like to deal with one or two of the mistakes which are possible when fitting a hot water supply for a

bath. It is, I believe, quite common practice to estimate the amount of hot water required for a bath from 15 to 20 gallons at 105° to 110° F.—not always wise, and in many cases very "rule of thumb."

Hot water at every point is certainly a good selling point but must be used carefully, as in some instances a multi-point instantaneous heater may be giving its maximum output and yet not be giving satisfaction, for one or more reasons:

(1) The heater can only be fitted at some distance from the bath, either for reason of air input necessary for proper combustion, or lack of space to fit in with the general plans of the house, or the wishes of the consumer, thereby entailing long runs of hot water pipe, and even with lagging some loss of heat occurs which cannot be allowed during the coldest weather.

(2) Such an installation may be fitted and working perfectly, but the consumer may be wasteful with hot water without realizing it, with the result that the consumption of gas is much above the amount specified. The individual is naturally dissatisfied and the whole installation may have to be taken out. Had an ordinary bath instantaneous heater been fitted, the trouble would not have arisen.

Instances like the foregoing indicate what a faulty choice can do and how careful one must be in giving advice regarding hot water for baths. I feel that two-thirds of the battle lies in discovering what type of person you are dealing with, and forming a correct opinion of his needs and requirements. You will then be in a position to give him the best advice, thereby ensuring the fullest measure of satisfaction.

AN EXPERIMENTAL STUDY OF Thin Tar Carpets

by
W. E. CONE
(Technical Adviser to the British Road Tar Association)

From a Paper read at a Plenary Meeting of the International Road Tar Conference held at Prague, Czechoslovakia, on May 24.

Thin carpets and surface dressing have their own particular place in the maintenance of roads, and each process should be considered accordingly. The interest of carpets lies in their ability to restore the good riding qualities of an otherwise sound road.

The writer has taken the opportunity of putting forward the following definition for thin tar carpets: "Balanced mixtures of suitable mineral aggregate, filler, and tar, laid by the cold, semi-hot, or hot process to a consolidated thickness of not more than 1 in. on prepared existing road surfaces." While it is recognized that this definition might not prove acceptable to everybody, it is hoped it will serve as a basis for discussion. Common agreement on a definition for these carpets would lead to a better understanding of the problems involved, and enable our studies to proceed on a more uniform plan.

General Principles of Design.

To enunciate the general principles of design upon which thin tar carpets should be based is not an easy matter, and this is further complicated by the demand for adequate frictional resistance between the wheel tyre and the road surface. Further emphasis is given to this in the Ministry of Transport's "Memorandum on the Lay-out and Construction of Roads," 1937, where it is stated that "the provision and maintenance of an adequate non-skid surface is of primary importance, and this quality should not be sacrificed in seeking to obtain durability." This guarded recognition of the more open type of carpet as one meeting the requirements for non-skid surfaces is all to the good, since it cannot be denied that while the dense type of impervious carpet might prove more durable, it is invariably associated with a slippery surface.

Coarse graded carpets have proved satisfactory, and are most in demand. The desirable ideal would be to design a mixture possessing both non-skid and durable qualities to a maximum degree, but as it is too much to hope that the ideal standard could be reached, it remains only to see that these requirements are met to the degree in which they are most important. There can scarcely be any question that non-skid quality is the first essential in designing the mixture, and this is usually obtained by incorporating a sufficient quantity of coarse aggregate to maintain a rough surface and retard film-formation. According to current theories of design, the voids of the coarse aggregate should be filled with the finer aggregate, and filler added to fill the voids of the coarse/fine aggregate. The amount of binder necessary to impart cohesiveness to the mixture is directly related to the void content or surface area of the total aggregate.

The characteristics of the particles of aggregate, as well as the proportions in which they are combined, are of major importance in determining suitable gradings for thin tar carpets, and it is suggested that with a correct understanding of their function in relation to stability a means is afforded of obtaining from compressed mixtures of relatively high void aggregate content a standard of durability consistent with that obtained from compressed mixtures of low void aggregate content, with the added advantage of a permanent non-skid surface which the other lacks.

The chief function of the tar is to impart cohesiveness combined with tensile strength to the compressed mixture, and to furnish the necessary resistance to displacement of the carpet under traffic conditions. More precise information has been obtained concerning the properties of tar as a binding medium, and this knowledge has led to considerable improvements in the quality of the material. The selection of a suitable quality and viscosity should be made with a full knowledge of the conditions under which the tar will be used, as this has an important bearing on the results to be obtained. The requirements can usually be met by the employment of high viscosity tar in conformity with British Standard Specification No. 2 or No. 3.

Comparatively little work appears to have been done with aqueous emulsions of road tar as a binding medium for premixed materials, although aqueous emulsions of bitumen have a wide field of application. Some interesting experimental work has been carried out with an aqueous emulsion of soft coal tar pitch, and the results achieved to date are very encouraging.

Methods of Construction.

Having regard to their limiting thickness and the functions thin tar carpets have to fulfil, every care and attention should be given to constructional details. The first and most obvious requirement is a well-drained and adequate foundation, without which troubles are bound to arise. In a great many cases the existing roadbed has sufficient natural stability to carry the traffic loads; but when this is lacking, proper corrective steps should be taken to make it good.

As many of these carpets are laid on surfaces already rich in tar or bitumen, it is customary to burn off any surplus material by means of a road heater. If necessary, the surface should be raked and reshaped according to its condition. To facilitate the adhesion of the carpet to the road, a paint coat of low viscosity tar, or a tar emulsion, should be applied and spread as thinly as possible. The mixture should be spread evenly on the foundation with rakes or shovels so that when consolidated by the roller it will have the thickness specified, with the surface even and true to grade. The laying should be done continuously, so that the number of joints between the old and new laid material may be reduced to a minimum. When it is not practicable to lay it continuously and a joint is unavoidable, the materials should be laid to battens, and the surface where the joint is to be made painted over with tar. Thin carpets should be applied in dry weather and when the road is clean and dry.

The Author then gave particulars, supplied by the Roads Department, Ministry of Transport, of various experimental thin surfacing coats.

Conclusion.

From studies already made, the following items are suggested as being the most important in the design of

mixtures: Economy in construction; rational basis of proportioning mixtures; workability; and surface texture of the compressed carpet. In addition to the factors governing the design of mixtures, a clear understanding of the influence which good materials and the best constructional methods exert on the results to be obtained from these carpets is one of the main requisites for bringing about still further improvement. The influence of foundation, traffic, materials, manufacturing and constructional methods should all be studied, in order to obtain the most efficient and economical results.

Proposals on the lines outlined above should provide an approach to the study of the problems of thin tar carpets, but it is recognized that the subject is one that calls for much more detailed examination than comes within the scope of this Paper.

City and Guilds of London Institute Examinations

The following questions were set in the City and Guilds of London Institute Examinations for 1936 in the subjects named.

MINOR COURSE IN GAS-WORKS PRACTICE.

Tuesday, April 27, 7 to 10 p.m.

(The maximum number of marks obtainable is the same for each question. Not more than six questions to be attempted.)

1. Give a description and sketches of the coke extractor of one form of continuous vertical retort, indicating the driving arrangements and the method of controlling the rate of carbonization.
2. Indicate (with sketches) the repairs likely to be required to the brickwork of a horizontal retort setting, stating after what periods of working you would expect such repairs to be necessary.
3. State the advantages and disadvantages of a bucket elevator, a belt conveyor, and a skip hoist for the handling of (*a*) coal, (*b*) coke.
4. Describe (with sketches) a method of maintaining a constant vacuum at the inlet to an exhauster.
5. Give a description and sketches of a modern cast-iron purifier of the "dry-luted" type, showing details and approximate dimensions of the plates, covers, and grid supports.
6. What do you consider to be the best means of removing tar-fog from gas? Give your reasons and a sketch of the plant required.
7. Describe (with sketches) a method of patching the sheeting of a gasholder without withdrawing water from the tank.
8. Sketch and describe one form of station governor, showing how it is compensated for variations of inlet pressure.

MINOR COURSE IN GAS SUPPLY PRACTICE.

Tuesday, April 27, 7 to 10 p.m.

(The maximum number of marks obtainable is affixed to each question. Not more than six questions to be attempted.)

1. State the advantage of waterless gasholders in relation to distribution. *(30 marks.)*
2. Sketch in cross-section a mains joint of any modern type in which rubber is employed. *(30.)*
3. What is the essential "slot" mechanism of any type of prepayment meter? If faulty, how does this affect the gas revenue? *(20.)*
4. Describe and sketch a safety device for use in conjunction with prepayment gas meters. *(20.)*
5. An estate is being supplied by a high-pressure gas main. What appliance would be fixed to each service? Give full reasons, stating what safety method is employed. *(30.)*
6. Show by sketches three flue arrangements commonly adopted in the ventilation of instantaneous water heaters. *(30.)*
7. What are the effects of altering the air supply to a burner used for incandescent lighting? *(20.)*
8. What is the function of the jacket water in connection with a gas engine? State the proportions of gas and air generally employed in gas engines. *(20.)*

GAS FITTING.

GRADE I.

Monday, April 26, 7 to 10 p.m.

(Not more than six questions to be attempted. The maximum number of marks obtainable is the same for each question.)

1. (*a*) Name three wood-working tools used by a gas fitter.
   (*b*) Give a list of four edge tools used by a gas fitter.
   (*c*) Give a list of any three different types of pipe-gripping tool with which you are familiar.
2. Re-write the following list of gas appliances and, against any five of them, state the correct maximum rate of gas consumption in B.Th.U.'s per hour:

   Large inverted lighting burner.
   Bowl fire.
   8-gallon wash boiler.
   7-radiant gas fire of normal type.
   Boiling ring.
   Oven burner of small cooker.
   Lighting burner by-pass flame.

3. The internal dimensions of the oven of a cooking stove are 18 in. by 16 in. by 21 in. high.
   Calculate:
   (*a*) The volume of the oven in cubic feet.
   (*b*) The area of a cake tray to fit this oven with a 1 in. clearance all round.
4. Re-write the following sentences and fill in the missing words in each of them:
   (*a*) Gas fitters' solder is composed of two parts of tin and . . . part of . . . .
   (*b*) Having extended a supply and fitted an additional appliance in a house, the first thing that should be done before turning on the gas at the meter is to . . .
   (*c*) Gas must have . . . in order to burn.
   (*d*) The correct screw thread for wrought iron or mild steel tubing is the . . . thread.
   (*e*) The correct tool to use on a chromium plated union is a . . . .
5. Make a table showing:
   (*a*) two tools,
   (*b*) two items of material,

   that you would require to carry out each of the following operations:
   (i.) Attaching a bracket block to a tiled wall.
   (ii.) Jointing wrought iron tubing to lead pipe.
   (iii.) Fitting an asbestos-cement sheet surround to a fireplace.
6. Answer any five of the following questions:
   (i.) Name three hardwoods.
   (ii.) State the size of connection to a 100 cu.ft. per hr. high-capacity meter.
   (iii.) Which has the lowest melting point, lead, tin, copper, or zinc?
   (iv.) What is malleable iron?
   (v.) Name a flux.
   (vi.) Name an inflammable spirit.
7. Choose any five of the following materials and give one use of each in connection with the manufacture or installation of gas appliances:
   (i.) Shellac.
   (ii.) Asbestos.
   (iii.) Paper.
   (iv.) Clay.
   (v.) Water.
   (vi.) Jute.
8. (*a*) State the first thing you would do before attempting to raise a floorboard on the 1st floor of a house.
   (*b*) Give a list of five tools necessary to raise a tongued and grooved floorboard.
   (*c*) State what you would use to secure a floorboard that you had replaced after raising.
9. Make well-proportioned freehand line sketches of any two of the following fittings:
   (*a*) A vertical cross-section of a $\frac{1}{2}$ in. male and female elbow, about twice full-size.

(*b*) An elevation of a plug-in socket for a flexible tube connection, about full-size.
(*c*) A plan of the hotplate of a small cooker, to an approximate scale of 2 in. to 1 ft.

GAS FITTING.

GRADE II.—WRITTEN PAPER.

Monday, April 26, 7 *to* 10 *p.m.*

(*Not more than six questions to be attempted. The maximum number of marks obtainable is the same for each question.*)

1. Fig. 1 on the attached sheet shows a gas appliance which it is required to ventilate to the outer air.

(*a*) By means of pencil lines on the sketch show how you would carry out this work and ensure good ventilation of the appliance and the room.
(*b*) By means of arrows and block letter printing indicate the component parts of the ventilating equipment.
(*c*) Detach the sketch and, by means of the gummed edge, attach it to your answer book.

2. You are carrying out the maintenance service of a gas cooker. No governor is fitted and all burners have variable injectors.

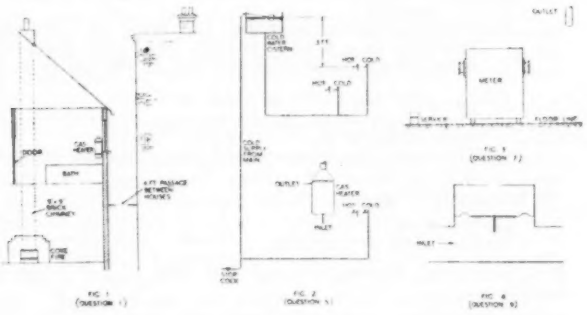
State very briefly (just a sentence on each is sufficient) how you would ensure that:

(i.) The hotplate is level.
(ii.) The oven gas rate is correct.
(iii.) The oven burners do not "smother."
(iv.) The hotplate burners are properly adjusted.
(v.) The thermostat is (*a*) mechanically correct; (*b*) calibrated correctly.

3. (*a*) Name the screw thread which is, or should be, used on each of any five of the following tubes and fittings:

(i.) Steel tubing, gas weight.
(ii.) Wrought iron tubing, steam weight.
(iii.) Malleable cast-iron fittings.
(iv.) By-pass tubing.
(v.) Brass tubing for gas fire connections.
(vi.) Brass tubing for pendants.
(vii.) Caps and linings for brass unions.

(*b*) Make a freehand line sketch of the cross-section along the axis of any type of joint for light gauge copper tubing.



4. The principal operations in fitting a water-sealed type of pressure recorder to a given gas point are:

(*a*) Wind clock.
(*b*) Level recorder.
(*c*) Remove drain plug.
(*d*) Set chart to correct time.
(*e*) Fill pen.
(*f*) Assemble recorder.
(*g*) Turn on gas.
(*h*) Fill with water to correct level.
(*i*) Attach chart to drum.
(*j*) Ensure that clock is working.
(*k*) Make certain pen is marking freely.
(*l*) Rotate drum to ensure chart being level.
(*m*) Replace drain plug.
(*n*) Set pen at zero line.
(*o*) Connect up to gas supply.

By means of the letters (there is no need to write the words) make a list showing the order in which you would carry out this work.

5. Fig. 2 on the attached sheet shows the existing cold water installation in a small house.

(*a*) By means of pencil lines on the sketch show how you would run the necessary pipes and connect up the multipoint "instantaneous" gas water heater to supply the three hot water taps.
(*b*) Indicate and name any valves or other special fittings that you consider to be necessary.
(*c*) Detach the sheet and attach it by means of the gummed edge to your answer book.

6. A hot water storage cylinder is 3 ft. 6 in. high and has a diameter of 1 ft. 4 in.

(*a*) By means of another return pipe it is desired occasionally to reduce the quantity of hot water in circulation to 15 gallons. Calculate the height from the base of the cylinder at which an additional return pipe should terminate.
(*b*) Name the fitting that you would employ to enable the change-over from one return pipe to the other to be made by the customer at will.

7. Fig. 3 on the attached sheet shows a large dry meter with the service and outlet pipe.

(*a*) By means of pencil lines on the sketch show how you would connect up and by-pass this meter.
(*b*) Indicate all necessary valves and other special fittings.
(*c*) With the aid of arrows and printing, point out the names of the important parts of the installation.
(*d*) If you have not already done so, detach the sheet and attach it by means of the gummed edge to your answer book.

8. The following list shows some of the important operations to be performed and precautions to be taken when cutting out a live 1½ in. service and inserting a tee in a dark, unventilated cellar:

(*a*) Cut service.
(*b*) Make your mate stand outside the cellar.
(*c*) Have all tools to hand.
(*d*) Examine electric torch.
(*e*) Have your mate in the cellar.
(*f*) Extinguish all naked lights.
(*g*) See that all threads run easily.
(*h*) Test for soundness.
(*i*) Insert temporary plug.
(*j*) See that all appliances are turned off.
(*k*) Put thread on cut service.
(*l*) Fit tee.
(*m*) Expel air.
(*n*) Fit connector.
(*o*) Connect up.
(*p*) Remove temporary plug.

(i.) By means of the letters (there is no need to write the words) make a list showing the order in which you would do this work.
(ii.) Omit any items you consider to be unnecessary.
(iii.) Write down one important precaution which has been omitted from the list above.

9. Fig. 4 on the attached sheet is an unfinished diagrammatic vertical cross-section of a 1-in. diaphragm type of pressure governor.

(i.) By means of pencil lines complete the diagram.
(ii.) Indicate by arrows, and name, the component parts of the governor as shown on your sketch.
(iii.) If you have not already done so, attach the sheet to your answer book.

GAS FITTING.

GRADE II.—PRACTICAL EXAMINATION.

(*Four hours allowed for this Examination. Candidates must attempt all the tests.*)

The following materials to be supplied to each candidate:

One 3-ft. length of 1-in. lead pipe (gas weight).
One 10-light meter cap and lining (or one 1-in. British Standard gas meter union).

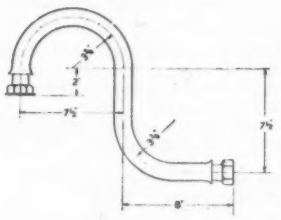


FIG. 1.
(QUESTION 1)

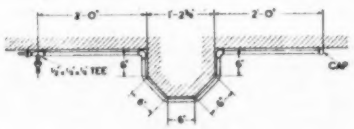


FIG. 2.
(QUESTION 2)

FIG. 3.
(QUESTION 3)

One 1-in. brass union (lead to British Standard Pipe thread).
One 8-ft. length of ½-in. wrought iron or mild steel tubing (steam weight).

Two ½-in. elbows.
One ½-in. by ¼-in. by ½-in. tee.
Two ½-in. tube cocks.
One ½-in. cap.
One 9-in. length of polished chromium plated ½-in. brass tubing.
One ¼-in. wrought iron or mild steel connector with socket and back-nut.

1. With the material provided, make a meter connection in 1-in. diameter lead pipe to the dimensions shown in fig. 1.
You may, if you desire, use springs and bobbins. (*Time allowed, 1½ hr.: 30 marks.*)

2. (*a*) With the length of steam weight tubing provided, make up the connection to the dimensions shown in fig. 2.
(*b*) Test your finished work for soundness with air at 6-in. water column pressure.

The use of a forge is not allowed. All bending must be done with the tubing cold. (*Time allowed, 1½ hr.: 30 marks.*)

3. From the 9-in. length of polished chromium plated brass tubing provided, produce a length with ends screwed in the manner and to the dimensions shown in fig. 3.
This work must be done without damaging or scoring the finished length of tubing. (*Time allowed, ½ hr.: 20 marks.*)

4. Observe the apparatus shown to you by the examiner and, in his presence:

(*a*) Adjust the governor to throw an outlet pressure of 2½-in. water column.
(*b*) By means of the throttle, adjust the burner to operate at a gas rate of 20 cu.ft. per hr. with the governor set at 2½-in. water column pressure. (*Time allowed, ½ hr.: 20 marks.*)

(To be continued.)

The Newcastle and South Shields Amalgamation

A proposal to amalgamate the Undertakings of the Newcastle-upon-Tyne and Gateshead Gas Company and the South Shields Gas Company was the main provision of the Newcastle-upon-Tyne and Gateshead Gas Special Order, which was the subject of Enquiry by Mr. J. F. RONCA, O.B.E. (Director of Gas Administration), at the Offices of the Board of Trade on June 3 and 4.

Sir Lynden Macassey, K.C., and Mr. Harold Willis appeared as Counsel for the promoters. There were objections by the Town Councils of South Shields and Jarrow and the Urban District Councils of Hebburn and Boldon. They were represented by Mr. W. Craig Henderson, K.C., and Mr. H. Royston Askew. Messrs. R. W. Cooper & Sons (Parliamentary Agents) watched the proceedings on behalf of the South Shields Gas Company.

Sir Lynden Macassey, K.C., opening the case for the promoters, said that provision was made in the Order for a small extension of the limits of supply of the Newcastle Company, in addition to the amalgamation. The area of supply of the Company was 193 sq. miles, including the City of Newcastle, the County Boroughs of Gateshead and Tynemouth, the Municipal Borough of Wallsend, and the Urban Districts of Whitley and Monkseaton, Earsdon, and Seaton Delaval, and a number of townships in the immediate vicinity. The population of the area was over 800,000. Differential prices applied in various parts of the area which had been added from time to time as the result of amalgamations.

Since 1929 the Company had operated on the basic price system and there was a different basic price for each of six parts of the area. The Company's Act of 1929 provided for the revision of the basic prices by the Board of Trade, and revision was in fact made in 1936. They varied from 7·2d. per therm in the inner area to 10·2d. per therm in the outermost area. The basic dividend, fixed in 1929, was 5%. The South Shields Company supplied an area of 22 square miles, having a population estimated at a little over 180,000. It was a sliding scale Company, the standard price being 11·8d. per therm, the standard dividends 7% on the consolidated stock and 5% on ordinary stock; the dividends paid since 1921 had been 8½% on the former and 5¾% on the latter. The capital expenditure per therm sold by the South Shields Company was 3s. 10·1d. in 1934, 3s. 10·2d. in 1935, and 3s. 9d. in 1936. The figures for the Newcastle Company were 2s. 5·4d. in 1934, 2s. 3·4d. in 1935, and 2s. 0·9d. in 1936.

In the South Shields Company's area of supply the price was 9d. per therm in the inner part and 9·8d. per therm in the outer part; there were discounts of 7½% for prompt payment, and other discounts running up to 20% or even higher for industrial consumers. In the Newcastle Company's area the published price for the inner part was 7·8d. per therm, and the published prices for the other parts of the area ranged from 7·8d. to 11·4d., subject to a discount of 10% for prompt payment for consumptions up to 2,000 therms per quarter, and 15% for prompt payment for consumptions above 2,000 therms per quarter. There was a variety of tariffs for different classes of consumers.

The Basis of Agreement.

The basis of the agreement for the amalgamation, dated Jan. 28, 1937, was that the South Shields Company shareholders should receive an amount of stock in the Newcastle Company, in exchange for the South Shields stock, to yield their present dividend return, on the assumption that the Newcastle Company dividend remained at the present figure of 5⅝%. The Newcastle Company was also to take over all the mortgage bonds of the South Shields Company. It was proposed that after the amalgamation the basis of charge in the South Shields area should be the basic system, and that the basic price inside the South Shields inner area should be 9d. per therm. In the South Shields outer area the proposed basic price was 9·8d. That would maintain the existing difference between the prices in the two parts of the area.

It was also proposed that the actual price which the amalgamated Company should be allowed to charge in the South Shields inner area was 1·2d. per therm over that actually charged in the Newcastle inner area; that again preserved the existing differences in the prices as between those two areas. In the South Shields outer area the price charged by the amalgamated Company was not to exceed the actual price in the Newcastle inner area by more than 2d. per therm. Other provisions were to the effect that after five years the meter rentals and the discounts and rebates allowed in the South Shields area were to be the same as in the Newcastle area.

The objectors raised four main points. In the first place, they contended that it was not expedient that the amalgamation should be authorized. Counsel commented that the Newcastle Company relied on the experience of the advantage and benefits which other amalgamations had conferred. Secondly, the objectors challenged the basic price system and expressed a preference for the sliding scale. Thirdly, they claimed that the existing basic prices in the Newcastle area were too high, their objections being founded apparently on the fact that in the Newcastle Company there was a margin between the authorized dividends and the profits available for dividends. Counsel commented that the Newcastle Company had given such great concessions to its consumers that it was not in a position to reap the full benefit that it would be entitled to otherwise in increased dividends; it had not the money to pay the full dividends. Fourthly, the opponents objected to the present prices in South Shields and Newcastle being taken as a basis for differential prices. They had suggested the possibility of coke oven gas being made available in the South Shields area, and that a reduction ought to be made in present prices for the purpose of arriving at the differentials. A number of provisions were asked for to control the operation of the basic price system. One would have thought, said Counsel, that that should wait until Parliament had come to a decision as to the action to be taken on the Report of the Gas Prices Committee.

Mr. *T. P. Ridley* (Commercial Manager and Secretary of the Newcastle Company), in the course of his evidence, said that new coke ovens had been erected in the district of the Company at Monkton, quite close to the boundary of the South Shields district. An agreement had been made with the coke oven works to supply the Company with about 750 million cu.ft. of gas per annum, and a main had been laid to convey that gas to the Redheugh Works of the Company at Gateshead. The agreement also provided that any additional surplus of coke oven gas from those coke oven works was to be offered to the Newcastle Company.

Discussing the proposal made by the opponents that the differential charges proposed in the Order should be reduced in

favour of the South Shields district, he said the Directors of the Newcastle Company took the view that amalgamations were not in the best interests of the Gas Industry or the nation if they did not benefit the consumers and the absorbed and the absorbing companies. If any reduction were made in the differential charges, resulting in the South Shields district obtaining gas at the expense of the Newcastle consumers, they would have to consider very seriously dropping that part of the Order referring to amalgamation. The Newcastle Corporation (which was not opposing the present Order) would have to be informed and must be given the opportunity of being heard.

Cross-examined by Mr. W. CRAIG HENDERSON, K.C. (for the opponents), Mr. *Ridley* said that the problem of supplying the various parts of the area of the amalgamated Company from the most economical sources was one for very careful consideration, and they had not yet made plans as to the sources of supply for the South Shields area. He agreed that there was nothing to prevent laying a main from the coke oven works to the South Shields works, and possibly that might be done eventually.

Mr. CRAIG HENDERSON pointed out that the whole output of the South Shields works to-day was just over 600 million cu.ft. per annum, and the whole of that quantity could be supplied, if thought fit, from the coke oven works.

Mr. *Ridley* agreed that that could be done if thought fit, but he reminded Counsel that the money had already been spent on the new main from the coke oven works to the Redheugh Gas-Works.

The Wrottesley Clause.

Cross-examined as to why the Wrottesley Clause should not apply to the Newcastle Company, Mr. *Ridley* said it was almost impossible to apply it to the Company as it was applied in present-day Orders on account of the Company's great variety of prices, brought about by the room basis of tariffs, &c. For every consumer it would be necessary to bring four quarters together and work on the average for the year.

Re-examined, he said he saw no reason why the coke oven gas, which was being utilized already in the Newcastle district, should be turned wholly into South Shields, or that the South Shields area should have a preferential right to that supply. The advantage of utilizing such a supply should go to the whole area, and the South Shields area would in any case secure its share of the benefit. If the whole of the coke oven gas were supplied to South Shields, as suggested, the consumers there would benefit at the expense of the Newcastle consumers.

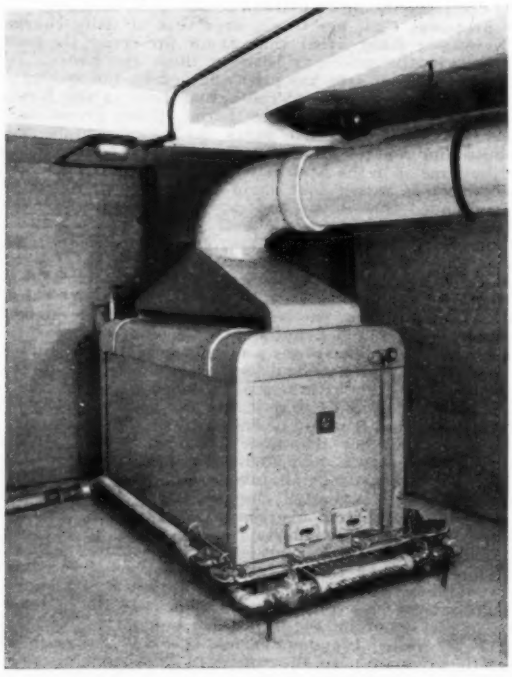
Mr. *A. W. White*, F.C.A. (of Messrs. Cash, Stone & Co., Chartered Accountants), produced a number of tables dealing with the finances of the two Companies, calculations of prices, &c., and said that the balance-sheet of the Newcastle Company as at Dec. 31, 1936, showed that the Company was very strong financially. The South Shields Company was not so strongly placed as the Newcastle Company, and its reserves were not so great proportionately.

Whereas in Newcastle the costs per therm had been reduced from 4·85d. in 1934 to 4·46d. in 1936 (due very largely to the development of industrial sales), in South Shields the costs per therm had increased from 5·63d. to 5·67d. in the same period. He would expect the costs in South Shields to rise further if the Undertaking remained separate. He believed the amalgamation would save the South Shields consumers from an increase in the price of gas. The terms of the amalgamation were absolutely fair. The South Shields Company shareholders would be placed in the same position as had applied over a long period in regard to dividends. Compensation to Directors, Auditors, and so on was in the usual form.

The Newcastle Company, operating under the basic system, had an authorized dividend of £6 9s. 7d.% for 1936, but actually paid 5⅜%. The South Shields Company, working on the sliding scale system, had authorized dividends of 10½% on the consolidated ordinary stock and 6¾% on the ordinary stock for 1936, but actually paid 8½% and 5¼% respectively.

Discussing a table showing the calculation upon which he based and justified the differentials proposed, he said the differentials in the order represented the exact differences between the top prices paid in South Shields and the Newcastle inner area. That course was often followed, though he did not necessarily admit that that was the correct way to do it. In this particular case the differential operated rather in favour of the South Shields consumers, because their costs had been very finely cut. Had the price in South Shields been increased a little earlier, the amalgamated Company would have been justified in asking for a bigger differential. The difference of 1·2d. per therm proposed as between the South Shields and Newcastle inner areas might justifiably have been higher. The consumers of South Shields were being treated generously. In the outer South Shields area the cost was 9·77d., which was 2·17d. higher than the cost in the Newcastle inner area, whereas the Order asked for a differential of only 2d. per therm.

Mr. White did not consider it desirable to include in the Order a provision for the revision of the differentials, and added that it was certainly not usual. The Company, he continued, might be able to secure some coke oven gas for supply in South Shields; but the South Shields Works must remain ready to supply, and if the coke oven gas supply should fail at any time they would have to manufacture again in South Shields, which might increase costs. It was very essential for the future to



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Swimming Pool Heating

"REX" Boilers are the embodiment of all that Gas offers as a fuel.

There are no moving parts.

Perfect silence of action is maintained.

Adequate surface for the absorption of the heat contained in the gases with ample area and accessibility of flue ways are among the problems considered in their design, and above all the continuity of efficiency throughout the heating season, combined with low maintenance cost, are outstanding features justifying their use by all Gas Undertakings for heating work.

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have some margin in the power of charge to maintain a proper balance between the respective areas. He felt that perhaps too much attention was paid to the differential price. The Newcastle Company was a multiple basic price company. But whatever might be the faults of basic price companies having multiple basic prices, they had one merit which transcended all the other difficulties; the Company had no incentive to do the wrong thing as between one area and another. If an economy were effected, the Company could pass it on to the consumers in any particular area.

Cross-examined with regard to the basis of the proposed differential charges, Mr. *White* said that if the Company closed the South Shields works and manufactured gas for South Shields in Newcastle, the economy effected thereby should not go wholly to the South Shields consumers, because it had been provided by the Newcastle people. The economy should be apportioned.

Replying to a suggestion that he was making an imaginary difficulty with regard to the application of the Wrottesley Clause, he said it was in fact a practical difficulty. It was very unsatisfactory to have different schemes of legislation applying to different parts of a Company's area; it was not practicable.

Mr. RONCA said he had always thought of the Wrottesley Clause as one applying to the whole of a Company's area; but he was being asked to consider it as applying to a part of the Company's area only.

Same Code Applicable to Whole Area.

Mr. *White*, in the course of discussion on this matter, would not say that it was wrong to apply the Clause to a particular part of a company's area; but the difficulty was that of application. There was also the desirability of a company having the same code applicable to the whole of its area.

Mr. RONCA, discussing the fixing of the basic price, asked if witness submitted that one ought to take the conditions existing when the new deal commenced and ought not to project the mind forward and review economies which were certain to be effected, on the ground that by so doing the Company was deprived of the reward that their great ability, financial strength, and greater efficiency had produced.

Mr. *White* said he did. He was also of the opinion that differentials ought to be left to the Company's discretion, because circumstances varied possibly more quickly than could be met by revision.

Mr. RONCA, bearing in mind the point that witness had claimed to justify a bigger differential than was in fact asked for, asked on what basis a start should be made if a revision clause were inserted in the Order.

Mr. *White* said it was extraordinarily difficult to conceive of the revision of the differential in the circumstances applying in this particular case. If the Newcastle Company had contemplated a revision of the differential prices in the future they would have asked for the maximum differentials to which they were entitled.

Mr. CRAIG HENDERSON (addressing Mr. Ronca on behalf of the opponents) said the striking thing about the Order was that it contained no promise at all of benefit and no provision for the protection of the consumers to ensure that benefits that were made should be shared with the consumers. The Order proposed a separate basic price and a differential price for the South Shields area. The proposed differential of 1·2d. per therm was based on the difference between the existing ordinary prices in the South Shields and Newcastle areas, and that was to be authorized for all time, without hope of revision. What was to happen in the future was to be left entirely to the discretion of the Company, and he submitted that that could not be justified.

Again, the principle upon which the basic price for an outer area was fixed was not that of the costs of production under the old regimé. A fair differential should be fixed, and then the basic price for the outer area should not exceed the basic price for the inner area *plus* that differential. Whether, in the case of an amalgamation, it was right that it should be on the basic of guaranteeing 8½% dividend on the stock held in the old Company was a matter for very serious consideration. The basic price in Newcastle was 7·2d. Allowing a differential of 1d., which he submitted was the very maximum that should be allowed, the basic price in the South Shields area would be 8·2d. He could not conceive a case in which one could more fairly ask for the application of the Wrottesley Clause. The accounts and accounting system could be so adjusted as to give the material from which to make the necessary calculations. It could not be difficult, when taking over a new area, to keep separate accounts of the revenue and expenditure in that area and to compare the revenue and expenditure of the Newcastle Company, and to arrive at the additional costs of supplying South Shields over those of supplying the Newcastle area.

Finally, he pointed out that about half the therms sold by the Newcastle Company were in the form of coke oven gas. If the actual manufacture of gas by the Newcastle Company were reduced more and more, the co-partnership percentage share remaining the same, there would be contributions to workers which would have an adverse effect on the balance of wages, and the dividends payable would be magnified in a manner unfair to the undertaking as a whole. Therefore, he asked that the Sunderland clause be applied to the South Shields area.

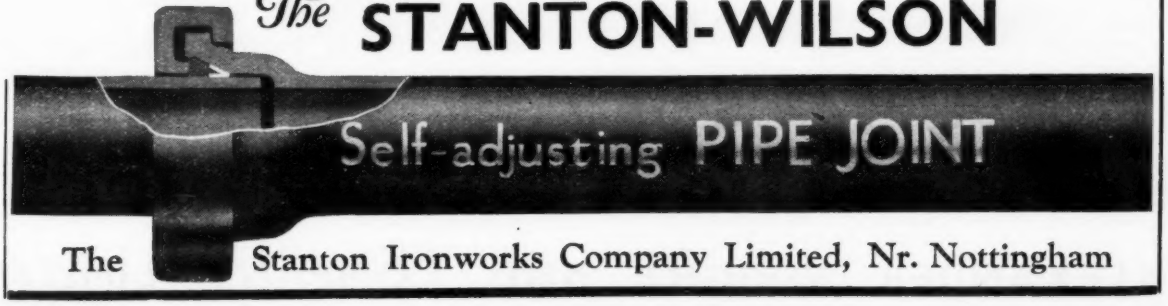
Traffic Vibration

Rigid or Self-adjusting Joints?

Not many of the problems brought into being by the remarkable growth of road transport during the last decade are capable of easy solution.

There is at least one exception, however. For instance, though much has been heard of the danger caused to historic buildings by traffic vibration, the harmful effects of such vibration on water and gas mains are not so apparent. To water and gas engineers responsible, however, for the maintenance of these essential public services, this was a very real problem until a few years ago, for rigidly-jointed mains could not be expected to withstand the severe vibration caused by modern conditions.

Some six years ago the Stanton Company introduced the Stanton-Wilson Self-adjusting pipe-joint to overcome this and similar difficulties. That it has successfully done so is proved by the fact that more than 1,500 miles of Stanton-Wilson mains have now been laid by over 750 public authorities.



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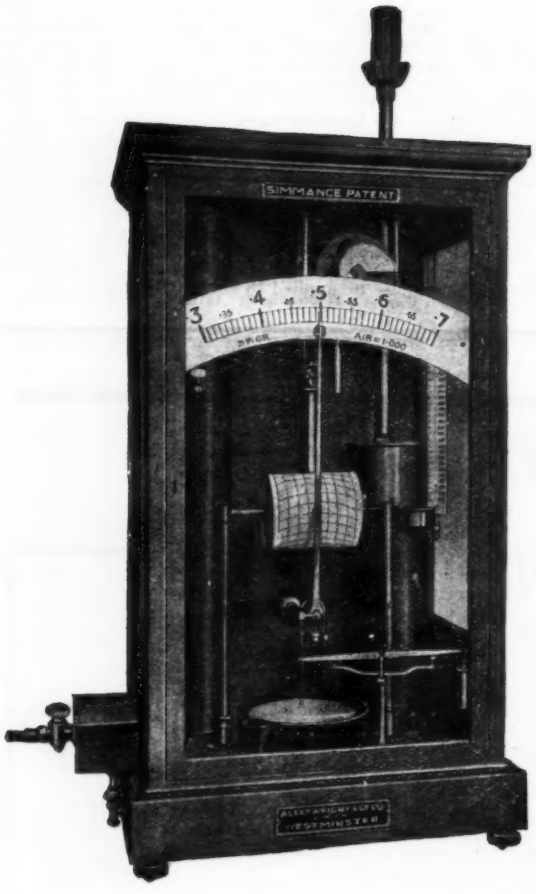

. . . . that, in our view, epitomises the import of the Papers and Discussions at the recent Institution Meeting.

Much of the information employed was based on data obtained from the Simmance Patent GRAVITOMETERS used at the Undertakings of the Members taking part, and from instruments made by this firm for the measurement of calorific value, carbon-dioxide, carbon-monoxide, A.T.B. number, and other factors affecting the efficiency of gas production and supply.

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ALEXANDER WRIGHT AND COMPANY LIMITED

WESTMINSTER, S.W. 1

Gas Markets and Manufactures

Stock Market Report

(For Stock and Share Lists, see later pages)

Inactive conditions again prevailed in nearly all sections of the Stock Exchange last week and price movements were very restricted. At one time there were indications of heavier support for Gilt-edged stocks, but the movement was short-lived and quotations subsequently closed fractionally lower. The latest Corporation issues, however, were well supported. Home rails attracted buyers on the latest good traffic returns, and several "ordinaries" finished a trifle harder. The industrial section, however, had few points of interest and movements were generally downward. Oil shares were supported, Royal Dutch and Leaseholds being good features, while gold-mining shares went ahead at the opening, but a subsequent return of uneasiness over the gold situation led to reactions.

The Gas Market was not unduly affected by the general conditions, the number of recorded transactions being little short of that reported a week ago. Prices continued very steady, and apart from the usual *ex*-interest markings due at this time of the year the only change in the quotation occurred in Imperial Continental ordinary, which rose 1 point to 156½.

It will be seen that the Gas Light and Coke Company's 3¾% redeemable preference stock, now officially quoted at 100-103, has been added to the Stock and Share List. Two issues of this stock were made last year—one of £2,000,000 in November at par, and a further £993,000 in December which was sold at 100⅜% net. The stock ranks *pari passu* with the existing 4% preference stock now quoted at the same price.

The accounts of the Plymouth and Stonehouse Gas Light and Coke Company for the year to March 31 last show a gross profit of £59,125, and after providing for the half-year's dividend to Sept. 30, interest, income-tax, and a transfer of £4,500 to renewal fund, there remains a balance of £49,136 available. The Directors propose to distribute a dividend for the half-year to March 31, at the rate of £8% per annum on £316,617 ordinary stock; 13s. 6d. per share on the "Additional" shares, and 13s. per share on the new shares. This will absorb £19,340, leaving £29,796 (against £29,748) to be carried forward. It is satisfactory to note that the current rates of dividend have been maintained for the past eight years. The ordinary stock was marked down to 165 *ex*-div. last week, at which price the yield is £4 17s.%.

Current Sales of Gas Products

The London Market for Tar Products.

June 14.

There are no changes to report in the prices of Tar Products, which remain as follows:

Pitch, 36s. to 37s. per ton f.o.b.
Creosote, 6d. to 6¼d.
Refined tar, 3¾d.
Pure toluole, 2s. 6d.; pure benzole, 1s. 9d.; 95/160 solvent naphtha, about 1s. 8d.; and 90/160 pyridine about 8s.—all per gallon naked at makers' works.

Tar Products in the Provinces.

June 14.

The average prices of gas-works products during the week were: Gas-works tar, 22s. 6d. to 27s. 6d. Pitch—East Coast, 35s. to 36s. f.o.b. West Coast—Manchester, Liverpool, Clyde, 35s. to 36s.* Toluole, naked, North, 2s. to 2s. 1d. Coal tar crude naphtha, in bulk, North, 8½d. to 9d. Solvent naphtha, naked, North, 1s. 6¼d. to 1s. 6½d. Heavy naphtha, North, 1s. 3d. to 1s. 3½d. Creosote, *ex* works, in bulk, North, liquid and salty, 5d. to 5½d.; low gravity, 4⅞d. to 4½d. Heavy oils, in bulk, North, 5d. to 5¼d. Carbolic acid 60's, 3s. 7½d. to 3s. 10½d. Naphthalene, £18 to £20. Salts, 90s. to 95s., bags included. Anthracene "A" quality, 4½d. to 4⅞d. per minimum 40% purely nominal; "B" quality, unsalable.

* All prices for pitch are now quoted on the basis of f.o.b. In order to arrive at the f.a.s. value at any port it will be necessary to deduct the loading costs and the tolls whatever they may be.

Tar Products in Scotland.

GLASGOW, *June* 12.

Business is perhaps not quite so brisk as it has been in recent months, but prices are nevertheless well maintained.

Crude gas-works tar.—The actual value is 37s. to 38s. per ton *ex* works in bulk.

Pitch remains a dull feature with values nominal at 30s. to 32s. 6d. per ton f.o.b. Glasgow for export, and 30s. per ton *ex* works in bulk for home trade.

Refined tar.—Abundant supplies are available at round 3d. to 3¼d. per gallon free on rails for export, and 3½d. to 3⅝d. per gallon *ex* works in buyers' packages for home trade.

Creosote oil.—This section has been receiving quite considerable attention recently and prices are steady as follows: Specification oil, 5½d. to 5¾d. per gallon; low gravity, 5¾d. to 6d. per gallon; neutral oil, 5¼d. to 5½d. per gallon; all *ex* works in bulk.

Cresylic acid.—No change can be recorded in prices although new business is not quite so plentiful. Pale, 97/99%, 4s. 5d. to 4s. 7d. per gallon; dark, 97/99%, 4s. 2d. to 4s. 4d. per gallon; and pale, 99/100%, 4s. 10d. to 5s. 1d. per gallon; all *ex* works in buyers' packages.

Crude naphtha is valued at 6d. to 6½d. per gallon *ex* works in bulk, according to quality and district.

Solvent naphtha.—90/160 grade is 1s. 4½d. to 1s. 5½d. per gallon, and 90/190 heavy naphtha is 11d. to 1s. per gallon.

Motor benzole continues steady at 1s. 4d. to 1s. 4½d. per gallon.

Pyridine.—Prices are nominal at 7s. to 8s. per gallon for 90/160 grade, and 8s. to 9s. per gallon for 90/140 grade.

Benzole Prices.

These are considered to be the market prices for benzole at the present time:

	s. d.		s. d.	
Crude benzole . . .	0 10	to	0 10½	per gallon at works
Motor ,, . . .	1 3¾	,,	1 4	,, ,,
90% ,, . . .	1 4½	,,	1 5	,, ,,
Pure ,, . . .	1 8¼	,,	1 9	,, ,,

Contracts Advertised To-Day

Coal.

Ashton-in-Makerfield Gas Department. [p. 882.]
Belfast Gas Department. [p. 882.]
Clitheroe Gas Department. [p. 882.]
Fleetwood Gas Company. [p. 882.]
Skegness Gas Department. [p. 882.]

Purifiers.

Glasgow Gas Department. [p. 882.]

Gas Undertakings' Results

Bolton.

The annual report on the Bolton Gas Department for the year ended March 31, 1937, shows the gross profit for the year as £61,826, an increase of £1,786 over last year. Of this amount £5,392 has been allocated as Revenue Contribution to Capital Account. The income this year from gas is down by £4,943 from last year's figures, and is due principally to the reduced sales of gas, consequent upon a mild winter period. The coke receipts show an improvement since the price of the coke has followed to a certain extent the increase in the cost of coal. The tar receipts are also improved and the prices have been maintained much better than could have been hoped for under the international market conditions. The gas made per ton of coal carbonized has exceeded the returns for all the years previous to 1936, when the record was set up, and the gas sold per ton of coal carbonized has also achieved the excellent figure of 17,910 cu.ft.

Guernsey.

The Directors of the Guernsey Gas Light Company present accounts for the year ended March 31, 1937, showing a balance at credit of profit and loss account, after paying the interest on debenture bonds and making the allocations shown in the accounts, amounts to £22,513. At an Extraordinary General Meeting held on June 29, 1936, a resolution was passed authorizing the issue of 8,000 bonus shares, and this was given effect to on July 1, 1936, to all shareholders then on the register with an intimation that dividends would be proportionately reduced. The Directors have fixed the dividend for this year at 4½%, and this will absorb £7,200 gross, leaving a balance of £15,313, which having regard to the fact that coal prices will be greatly increased at the expiration of existing contracts, the Directors have decided to carry forward. The sale of gas during the year was 237,166,100 cu.ft.—an increase of 12,698,800 cu.ft. over last year—while the number of consumers has increased by 490, making the total at the year end, 8,616. During the year mains have been extended a distance of 3½ miles, making the total at the year end, 78½ miles.

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NEW VERTICAL RETORT PLANTS NOW IN REGULAR SERVICE

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This installation, built for the Municipality of Svendborg, Denmark, is an interesting example of the modern Glover-West vertical retort plant designed for the smaller works. It is an eight-retort unit with fuel-gas producers equipped for breeze-burning, waste-heat recovery plant and electric lift. Coaling is by means of an automatic skip-hoist.

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MANCHESTER: ALBION IRONWORKS, MILES PLATTING ■ LONDON: COLUMBIA HOUSE, ALDWYCH, W.C. 2

STOCK AND SHARE LIST

Official Quotations on the London Stock Exchange

Issue. £	Stock or Share	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations June 11.	Rise or Fall on Week.	Transactions, Lowest and Highest Prices During the Week.
1,767,439	Stk.	Mar. 15	8	8	Alliance & Dublin Ord. ...	170—175	...	171¾
374,000	,,	Dec. 14	4	4	Do. 4 p.c. Deb. ...	96—101	...	...
558,890	,,	Feb. 15	7	7	Barnet Ord. 7 p.c.	160—165	...	161—162
300,000	1	Apl. 5	1/4⅛	1/9⅛	Bombay, Ltd.	25/6—27/6	...	...
179,915	Stk.	Mar. 1	9½	9½	Bournemouth sliding scale ...	195—205	...	...
590,407	,,	,,	7	-	Do. 7 p.c. max. ...	161—166	...	161—162
493,960	,,	,,	5	6	Do. 6 p.c. Pref ...	133—138	...	...
50,000	,,	Dec. 14	2	3	Do. 3 p.c. Deb. ...	80—85	...	...
262,025	,,	,,	4	4	Do. 4 p.c. Deb. ...	100—105	...	101
335,000	,,	,,	5	5	Do. 5 p.c. Deb. ...	118—123	...	...
357,900	,,	Feb. 15	7½	7½	Brighton, &c., 6 p.c. Con. ...	155—160	...	...
649,955	,,	,,	6¾	6¾	Do. 5 p.c. Con. ...	138—143	...	...
205,500	,,	,,	6	6	Do. 6 p.c. 'B' Pref.	130—135	...	...
855,000	,,	Mar. 1	7	8	British Ord.	148—153	...	151½—152½
100,000	,,	Dec. 14	7	7	Do. 7 p.c. Pref.	143—148	...	...
350,000	,,	,,	5½	5½	Do. 5½ p.c. 'B' Cum. Pref.	110—115	...	...
120,000	,,	June 7	4	4	Do. 4 p.c. Red. Deb. ...	95—100*	...	...
450,000	,,	,,	5	5	Do. 5 p.c. Red. Deb. ...	102—107*	−1	...
450,000	,,	,,	3½	3½	Do. 3½ p.c. Red. Deb. ...	95—100*	...	...
100,000	10	22 May '33	6	4	Cape Town, Ltd.	1—3	...	40/-—41/-
100,000	10	6 Nov.'33	4½	4½	Do. 4½ p.c. Pref. ...	1⅛—3⅛	...	...
150,000	Stk.	Jan. 4	4½	4½	Do. 4½ p.c. Deb. ...	80—85	...	...
626,860	,,	Feb. 1	6	6	Cardiff Con. Ord.	120—125	...	...
237,860	,,	June 7	5	5	Do. 5 p.c. Red. Deb.	107—112*	...	...
98,936	1	Apl. 5	2/-	2/-	Colombo Ord.	1⅞—1⅞	...	...
24,510	1	,,	1/4½	1/4½	Do. 7 p.c. Pref. ...	23/—25/-	...	...
739,453	1	Mar. 15	-/11·48	-/11·48	Colonial Gas Assn. Ltd. Ord.	17/—19/-	...	17/-
296,144	1	,,	1/3·30	1/3·30	Do. 8 p.c. Pref.	22/—24/-	...	22 9
1,775,005	Stk.	Feb. 1	5	5	Commercial Ord.	88—93	...	92
620,000	,,	June 7	3	3	Do. 3 p.c. Deb. ...	74—79*	+1	76½
286,344	,,	Feb. 15	5	5	Do. 5 p.c. Deb. ...	115—120	...	...
807,560	,,	Feb. 15	7	7	Croydon sliding scale ...	143—148	...	...
644,590	,,	,,	5	5	Do. max. div.	109—114	...	110
620,385	,,	Dec. 14	5	5	Do. 5 p.c. Deb.... ...	115—120	...	...
239,000	,,	Feb. 1		5	East Hull Ord. 5 p.c....	100—105	...	...
185,355	,,	Feb. 15	6	6	East Surrey Ord. 5 p.c. ...	122—127	...	...
176,211	,,	June 7	5	5	Do. 5 p.c. Deb. ...	113—118*	...	...
250,000	1	Nov. 16	6	4	Gas Consolidation Ord. ...	20/—22/-	...	...
250,000	1	May 24	4	4	Do. 4 p.c. Red Cum. Pref.	19/—21/-	...	19.9
19,255,284	Stk.	Feb. 1	5⅜	5⅜	Gas Light & Coke 4 p.c. Ord.	25/—26/-a	...	25/3—25/7½
2,600,000	,,	,,	3½	3½	Do. 3½ p.c. max.	80—83	...	81½—83
4,477,106	,,	,,	4	4	Do. 4 p.c. Con. Pref. ...	100—103	...	101⅛—102⅜
2,993,000	,,	,,	...	...	Do 3½ p.c. Red. Pref.	100—103	...	101⅞—102⅜
8,602,497	,,	May 24	3	3	Do. 3 p.c. Con. Deb. ...	80—83	...	82½—83½
3,642,770	,,	,,	5	5	Do. 5 p.c. Red. Deb. ...	109—113	...	...
3,500,000	,,	,,	4½	4½	Do. 4½ p.c. Red. Deb....	108—111	...	110
700,000	,,	Mar. 1	25/5§	3¼	Do. 3½ p.c. Red. Deb....	98—101	...	100½
270,466	,,	Feb. 15	6	6	Harrogate New Cons. ...	122—127	...	...
213,200	,,	Feb. 15	6	6	Hornsey Con. 3½ p.c. ...	120—125	...	...
5,600,000	,,	May 24	8	12	Imperial Continental Cap. ...	154—159	+1	154—158
223,130	,,	Feb. 1	3½	3½	Do. 3½ p.c. Red. Deb. ...	90—95	...	...
285,242	,,	Mar. 1	8½	8½	Lea Bridge 5 p.c. Ord. ...	160—165	...	...
11,751	,,	Mar. 1	8	10	Maidstone Gas 5 p.c. Cap. Stk.	180—190	...	...
63,480	,,	Dec. 14	3	3	Do. 3 p.c.Prp.Db.Sk.	72—77	...	74
75,000	,,	May 24	†10	†10	Malta & Mediterranean ...	150—160	...	...
392,000	—	Apl. 1	5½	5½	Metropolitan (of Melbourne) 5½ p.c. Red. Deb.	98—103	...	...
231,978	Stk.	Feb. 15	5	5	M.S. Utility 'C' Cons. ...	102—107	...	...
968,657	,,	,,	4	4	Do. 4 p.c. Cons. Pref.	95—100	...	98½—99½
360,075	,,	Dec 14	4	4	Do. 4 p.c. Deb. ...	97—102	...	99¼—100
148,955	,,	,,	5	†5	Do. 5 p.c. Deb. ...	115—120	...	...
125,000	—	Jan. 4	3½	3½	Do. 3½ p.c. Rd.Rg.Bds.	97—100	...	...
675,000	Stk.	May 3	†6	†9	Montevideo, Ltd.	85—90	...	88½—89½
250,000	,,	Feb. 15	7½	7½	North Middlesex 6 p.c. Con.	152—157	...	...
396,160	,,	Feb. 1	5	5	Northampton 5 p.c. max. ...	102—107	...	...
300,000	,,	Apl. 19	†9	†7	Oriental, Ltd....	162—167	...	165—166
468,537	,,	June 7	8	8	Plymouth & Stonehouse 5 p.c.	160—170*	−2½	...
621,667	,,	Feb. 15	8½	8½	Portsmouth & Gosport Cons.	167—172	...	...
241,446	,,	,,	5	5	Do. 5 p.c. max. ...	105—110	...	...
73,350	,,	,,	...	5	Do. 5 p.c. Pref. ...	112—117	...	...
441,275	1	May 3	1/-	1/1⅛	Severn Val. Gas Cor. Ltd. Ord.	21/—23/-	...	22/—22/6
460,810	1	Mar. 15	-/10⅛	-/10⅛	,, ,, 4½ p.c. Cum. Pref.	20/—22/-	...	...
133,201	Stk.	Feb. 15	5	8½	Shrewsbury 5 p.c. Ord. ...	140—145	...	138
90,000	10	June 7	†4	‡4	South African...	3¾—4¾*	−¼	...
1,371,752	1	May 3	1/2⅛	1/2⅛	South East'n Gas. Cn.Ld. Ord.	24-/—26/-	...	25.3—25/6
871,636	1	Mar. 1	-/10⅛	-/10⅛	Do. 4½ p.c. Red. Cum. Pref.	20/—22/-	...	...
498,818	1	,,	4	4	Do. 4 p.c. Cum. Pref. ...	19/6—21/6	...	...
450,000	,	Feb. 15	4	4	Do. 4 p.c. Deb.	100—102	...	...
150,000	Stk.	,,	3½	3½	Do. 3½ p.c. Red. Deb. ...	99—101	...	...
6,709,895	,,	Feb. 1	5	6	South Met. Ord.	107—110	...	108¾—109½
1,135,812	,,	,,	6	6	Do. 6 p.c. Irred. Pf. ...	132—137	...	...
850,000	,,	,,	4	4	Do. 4 p.c. Irred. Pf. ...	97—100	...	99½—100
1,895,445	,,	Dec. 14	3	3	Do. 3 p.c. Deb. ...	75—80	...	79
1,000,000	,,	Jan. 4	5	5	Do. 5 p.c. Red. Deb....	107—112	...	...
1,543,795	,,	Feb. 1	6	6	South Suburban Ord. 5 p.c....	122—127	...	...
512,825	,,	,,	5	5	Do. 5 p.c. Pref....	112—117	...	...
500,000	,,	,,	4	4	Do. 4 p.c. Pref....	95—100	...	97
888,587	,,	Juue 7	5	5	Do. 5 p.c. Deb....	115—120*	...	115—119
250,000	,,	,,	4	4	Do. 4 p.c. Deb....	97—102*	−1	97½
427,859	1	May 3	9⅜	1/2⅛	S. Western Gas & Water Ord.	19/—21/-	...	20/-
160,523	1	Apl. 19	-/10⅛	-/10⅛	Do. 4½ p.c. Red. Cum. Pf.	20/—22/-	...	...
110,000	Stk.	Dec. 14	4	4	Do. 4 p.c. Red. Deb. ...	98—103	...	...
750,541	,,	Feb. 1	5	5⅛	Southampton Ord. 5 p.c. ...	111—116	...	115⅜
148,836	,,	June 7	4	4	Do. 4 p.c. Deb.	97—102*	−1	98—99½
350,000	,,	Feb. 15	5½	5½	Swansea 5½ p.c. Red. Pref. ...	110—115	...	...
106,000	,,	June 7	6½	6½	Do. 6½ p.c. Red. Deb. ...	97—100*	−1	...
94,000	,,	,,	3½	3½	Do. 3½ p.c. Red. Deb. ...	95—100*	...	...
1,076,490	,,	Feb. 15	6½	6½	Tottenham and District Ord.	137—142	...	140—140½
409,835	,,	,,	5½	5½	Do. 5½ p.c. Pref....	123—128	...	...
62,235	,,	,,	5	5	Do. 5 p.c. Pref. ...	110—115	...	...
371,850	,,	June 7	4	4	Do. 4 p.c. Deb. ...	97—102*	−1	...
373,939	,,	Feb. 15	7	7	Uxbridge, &c., 5 p.c. ...	142—147	...	...
133,010	,,	,,	5	5	Do. 5 p.c. Pref. ...	110—115	...	115
1,371,138	,,	Feb. 1	7	7	Wandsworth Consolidated ...	143—148	...	144—146¾
1,620,615	,,	,,	5	5	Do. 5 p.c. Pref ...	113—118	...	...
500,000	,,	,,	33/4	4	Do. 4 p.c. Pref. ...	95—100	...	...
1,343,964	,,	June 7	5	5	Do. 5 p.c. Deb. ...	115—120*	−2	...
383,745	,,	,,	4	4	Do. 4 p.c. Deb. ...	97—102*	−1	...
558,342	,,	Feb. 1	7	7	Watford and St. Albans Ord.	142—147	...	145½—147
200,000	,,	,,	5	5	Do. 5 p.c. Pref. ...	110—115	...	...
200,000	,,	,,	5½	5½	Do. 5½ p.c. Pref. ...	123—128	...	...
200,000	,,	June 7	4	4	Do. 4 p.c. Red. Deb.	97—102*	...	...
100,000	,,	,,	3½	3½	Do. 3½ p.c. Red.Deb.	95—100*	...	...

a.—The quotation is per £1 of Stock. * Ex div. † Paid free of Income-tax. ‡ For year. § Actual.

Stock and Share List continued overleaf.

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STOCK AND SHARE LIST—Cont.

Stocks Officially Quoted on Provincial Exchanges

Issue. £	Stock or Share	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations. June 11.	Rise or Fall on Week.	Transactions, Lowest and Highest During the Week.
BRISTOL EXCHANGE.								
347,756	Stk.	Feb. 1	5	6	Bath Cons.	121—123	...	...
1,667,250	,,	Feb. 15	5	5	Bristol, 5 p.c. max.	116—117	...	...
120,420	,,	June 7	4	4	Do. 1st 4 p.c. Deb. ...	100¼—102½*	—1½	...
217,870	,,	,,	4	4	Do. 2nd 4 p.c. Deb. ...	100½—102½*	—1½	...
328,790	,,	,,	5	5	Do. 5 p.c. Deb.	120—123*	—2	...
274,000	,,	Mar. 1	5	5	Newport (Mon.) 5 p.c.max. ...	103—108	...	...
13,200	12	Mar. 15	7	8	Pontyp'l Gas & W. 10 p.c. 'A'	13½—14½	...	...
13,600	10	,,	5	6	Do. 7 p.c. 'B'	12—12½	...	...
40,000	10	,,	5	6	Do. 7 p.c. 'C'	12—12½	...	...
140,778	Stk.	Feb. 1	5	5	Weston-super-Mare Cons. ...	112—113	...	...
64,338	,,	Dec. 14	4	4	Do. 4 p.c. Deb.	98—101	...	...
33,340	,,	,,	7½	7½	Do. 7½ p.c. Deb.	160—163	...	...
LIVERPOOL EXCHANGE.								
157,150	Stk.	Feb. 1	5	6½	Chester 5 p.c. Ord.	106—111	...	...
92,500	,,	Dec. 14	4½	4	Do. 4 p.c. Pref.	98—102	...	...
36,430	,,	,,	3	3½	Do. 3½ p.c. Deb.... ...	90—95	...	...
41,890	,,	,,	4	4	Do. 4 p.c. Red. Deb. ...	99—103	...	...
2,167,410	,,	Feb. 15	6	6	Liverpool 5 p.c. Ord. ...	125½—127½	...	...
245,500	,,	Dec. 14	5	5	Do. 5 p.c. Red. Pref. ...	101—106	...	...
306,083	,,	Jan. 4	4	4	Do. 4 p.c. Deb. ...	103—105	...	...
106,280	,,	Feb. 1	10	10	Preston 'A' 10 p.c.	210—220	...	...
188,219	,,	,,	7	7	Do. 'B' 7 p.c.	150—160	...	...
NEWCASTLE EXCHANGE.								
122,577	Stk.	Feb. 1	8	8	Blyth 5 p.c. Ord.	166—168	...	...
732,000	,,	Feb. 15	5	5	Hartlepool G. & W. Cn. & New	124—126	...	...
2,061,315	,,	Feb. 1	5	5⅔	Newcastle & Gateshead Con.	25/3—25.9a	...	...
682,856	,,	,,	4	4	Do. 4 p.c. Pref. ...	100—101	...	...
776,706	,,	Jan. 4	3½	3½	Do. 3½ p.c. Deb. ...	93—94	...	...
277,285	,,	Nov. 2	5	5	Do. 5 p.c. Deb. '43...	108—109	...	...
332,351	,,	Feb. 1	6	6	Sunderland 6 p.c. max. ...	139—141	...	...
NOTTINGHAM EXCHANGE.								
542,270	Stk.	Mar. 1	7	9	Derby Con.	155—165	...	...
55,000	,,	June 7	4	4	Do. 4 p.c. Deb.	100—105*	...	...
84,750	,,	Feb. 17	5	12	Long Eaton 'A' Ord. ...	...	...	...
50,000	,,	,,	4	10	Do. 'B' Ord. ...	...	...	...
20,000	10	Dec. 14	5	5	Do. 5 p.c. Pref. ...	10—12	...	...
80,000	Stk.	,,	5	5	Do. 5 p.c. Deb. ...	105—110	...	...
SHEFFIELD EXCHANGE.								
10,000	Stk.	Aug. 10	10	10	Great Grimsby 'A' Ord. ...	210—220	...	...
6,500	,,	,,	10	10	Do. 'B' Ord. ...	210—220	...	...
79,000	,,	,,	10	10	Do. 'C' Ord. ...	205—210	...	...
1,806,339	,,	Feb. 15	6	6½	Sheffield Cons.	144—146	...	...
95,000	,,	Jan. 4	4	4	Do. 4 p.c. Deb.	101—104	...	...

Supplementary List of Stocks and Shares not Officially Quoted

202,152	Stk.	Mar. 15	25/-b	25/-b	Ascot Ord.	102—107	...	...
128,182	,,	Jan. 4	5	5	Do. 5 p.c. Pref.	110—115	...	...
312,083	1	May 24	5	5	Assd. Gas and Water Ord. ...	19/6—21/6	...	20/—20/9
326,071	1	,,	4½	4½	Do. 4½ p.c. Cum. Pref. ...	19/6—21/6	...	20/—20/4½
150,000	Stk.	Mar. 15	3½	3½	Do. 3½ p.c. Red. Deb. ...	95—100	...	97¼
17,000	,,	Feb. 15	8	8	Bognor Orig. Ord. 'A' ...	160—170	...	...
62,210	,,	,,	8	8	Do. New Addl. 'A' ...	160—170	...	...
87,160	,,	,,	7	7	Do. New 7 p.c. max. ...	140—145	...	...
37,440	,,	Feb. 1	10	10	Cam. Univ. & Town 10 p.c.max.	195—205	...	...
125,970	,,	,,	7	7	Do. 7 p.c. max.	137—142	...	...
39,025	,,	,,	5	5	Do. 5 p.c. max.	98—103	...	...
65,000	,,	Mar. 1	7½	8½	Eastbourne 'A' 5 p.c. ...	160—165	...	...
198,000	,,	,,	6	7	Do. 'B' 3½ p.c.	130—140	...	...
112,312	,,	,,	5	5	Do. 5 p.c. Pref.	110—115	...	...
130,000	,,	Dec. 14	5	5	Do. 5 p.c. Deb.	115—120	...	...
24,000	30	Feb. 1	8½	8½	Great Yarmouth 8½ p.c. max.	45—50	...	...
59,400	30	,,	7½	7½	Do. 7½ p.c. max.	40—45	...	...
51,160	Stk.	June 7	5½	5½	Do. 5½ p.c. Deb.	120—125*	—2	...
152,600	,,	Feb. 15	8	9	Guildford Cons.	190—200	...	...
54,055	,,	,,	5	5	Do. 5 p.c. Pref.	112—117	...	...
68,250	,,	June 7	5	5	Do. 5 p.c. Deb.	113—118*	—2	...
156,600	,,	Feb. 15	7½	7½	Hampton Court Cons. ...	155—160	...	...
107,960	10	Mar. 15	4	5½	Mid Kent Ord.	9—10	...	...
230,940	Stk.	Feb. 15	10	10	Oxford & District Ord. ...	200—210	...	210—211
47,112	,,	,,	5	5	Do. 5 p.c. Pref.	110—115	...	...
50,000	,,	,,	6	6	Do. 6 p.c. Red. Pref. ...	112—117	...	...
126,193	,,	May 3	7½	7½	Peterborough Ord.	159—169	...	...
64,990	,,	Mar. 15	6¾	7½	Redditch Ord.	127—137	...	...
166,850	,,	Feb. 15	8	8	Romford Ord.	157—167	...	...
60,000	,,	,,	4	4	Do. 4 p.c. Pref.	97—100	...	...
44,000	,,	Mar. 15	5	5	Do. 5 p.c. Deb.	115—120	...	...
10,950	,,	Mar. 1	8	8	Ryde Ord.	160—165	...	...
136,191	,,	Feb. 15	5	7	Scarborough Ord.	123—133	...	...
27,825	,,	Feb. 1	8	8	Shanklin & Ventnor Cons. ...	158—168	...	...
270,086	,,	Mar. 15	7	7	Slough Ord.	137—142	...	...
21,000	,,	Dec. 14	5	5	Do. 5 p.c. Deb.... ...	113—118	...	...
28,872	1	May 24	5½	5½	S. Midland Gas Cpn. Ltd. Ord.	19/—21/-	...	...
28,866	1	Mar. 15	4½	4½	Do. 4½ p.c. Red. Cum. Pref.	18/6—20.6	...	...
137,730	Stk.	Feb. 15	7	7	Southgate & Dist. 7 p.c. max.	140—145	...	...
62,500	,,	,,	5	5	Do. 5 p.c. Pref.	110—115	...	...
117,228	,,	Feb. 15	6	5	Swindon Cons.	108—113	...	...
60,425	,,	June 7	5	5	Do. 5 p.c. Deb.	111—116*	—2	...
64,380	,,	June 7	5	5	Torquay and Paignton 5 p.c. Pf	113—118*	—2	...
1,750,000	1	Apl. 5	4	6	Utd. Kingdom Gas Cpn. Ord.	20/6—22/6	...	21/—21/3
936,338	1	May 3	4½	4½	Do. 4½ p.c. 1st Cum. Pref.	20/—22/-	...	21/3
674,084	1	June 7	4½	4½	Do. 4½ p.c. 2nd Non-Cum. Pref.... ...	17/—19/-*	—/6	17/3—17.9
600,000	Stk.	Mar. 15	3½	3½	Do. 3½ p.c. Red. Deb. ...	96—99	...	97—97¾
130,000	,,	Feb. 15	5	8	Wakefield Ord.	126—131	...	...
81,650	,,	,,	5	5	Do. 5 p.c. max.	103—108	...	...
82,000	,,	Feb. 1	6	6	Weymouth Ord.	103—108	...	...
98,384	,,	Feb. 1	6	6	Wolverhampton 6 p.c. Pref....	125—130	...	...
160,000	,,	Dec. 14	5½	5½	Do. 5½ p.c. Rd. Db	110—115	...	...
370,000	,,	Feb. 15	4	6	York Cons.	105—110	...	...
90,000	,,	Dec. 14	5	5	Do. 5 p.c. Red. Deb. ...	105—110	...	...
133,640	,,	Mar. 1	6½	6½	Yorktown (Cam.) 5 p.c ons.	130—135	...	...
120,000	,,	,,	5	5¾	Do. 5 p.c. Pref.	110—115	...	...
35,000	,,	June 7	5½	5½	Do. 5½ p.c. Deb.... ...	123—128*	—2	...

a The quotation per £1 of Stock b Actual for Quarter. * Ex div.

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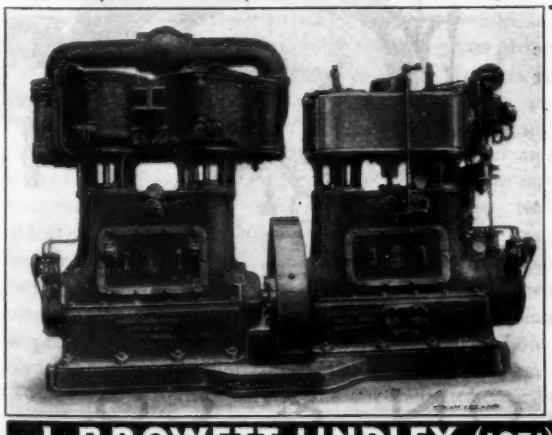

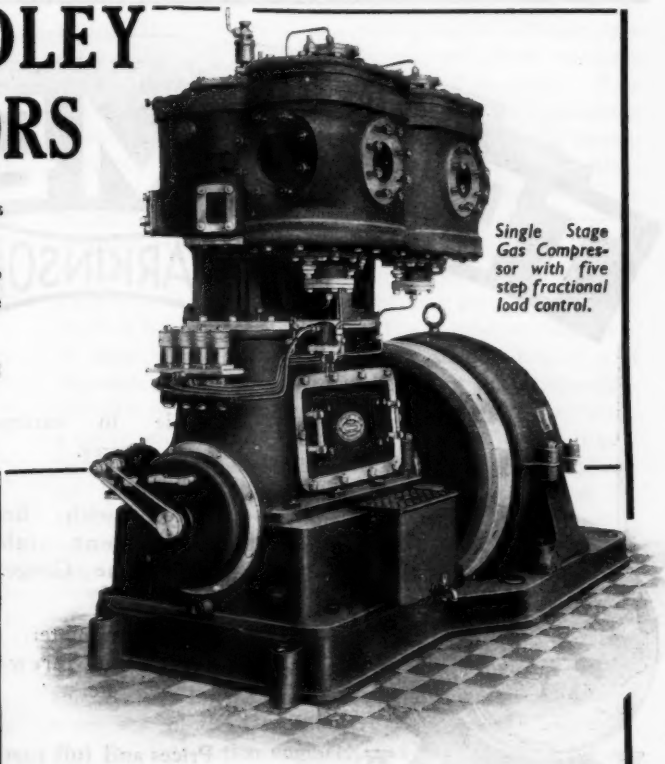

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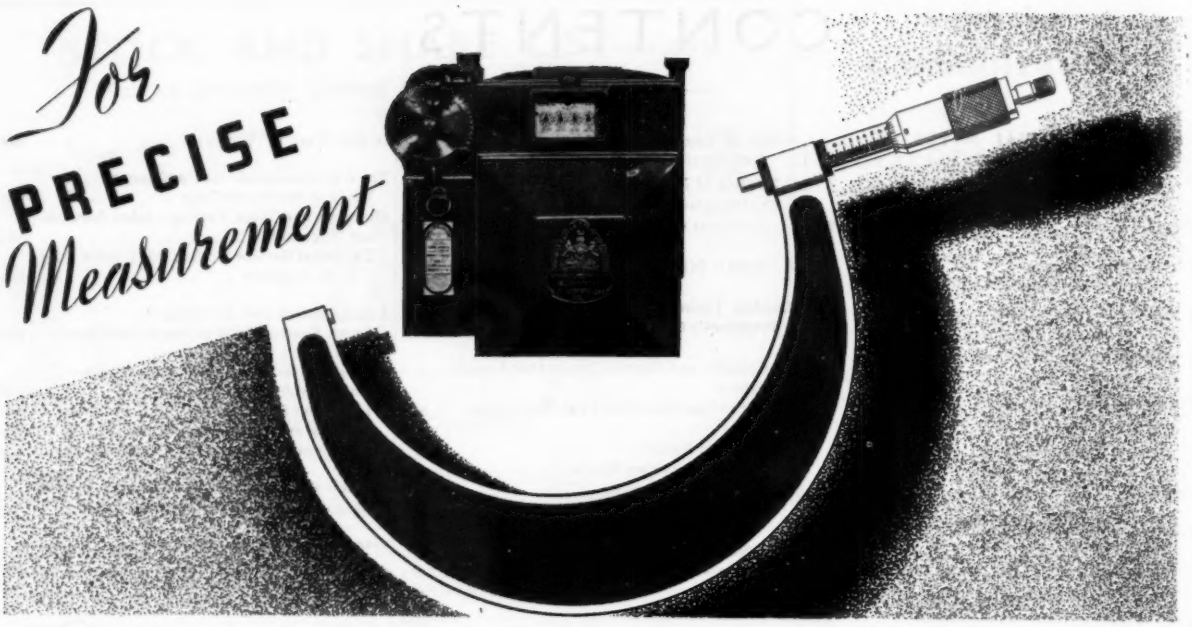

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